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ABSTRACT

The 16 papers in this collection focus on the impact of new technologies on libraries and their managers: (1) "Has Technology Failed Us?" (Frederick W. Lancaster); (2) "The Wheel of Fortune: Academic Libraries. IT and the Re-emerging Past" (Alasdair Paterson); (3) "Management Strategies for Enhancing the Adoption of Technological Innovations" (Mary M. Huston and Anita Grahn); (4) "Training Issues in Management of Information Services in an Advanced Technological World" (Ellen Hoffmann); (5) "The Next Generation of Information Products" (Arnoud de Kemp); (6) "'Free' or 'Fee' Information Resources in Academic Libraries--The Case of Small and/or Developing Countries" (Shmuel Sever); (7) "Providing Scholars with Information from Electronic Books" (Frederick Kilgour); (8) "Micro Management: Multi-Tasking and CD-ROM Applications" (David Price); (9) "CD-ROM-Retrieval in Heterogeneous Networks--Conceptions, Solutions, Conclusions, and Influence on Library Management" (Christian Heinisch); (10) "Co-operative Bibliographic Utilities as a Platform To Support Library Automation and Catalogue Retroconversion in Local Library Systems" (Ronald M. Schmidt); (11) "Managing Information Technology in Academic Libraries" (David R. McDonald); (12) "Information Retrieval at the University Library Vienna--RDB--The Austrian Legal Database" (Renate Niegl); (13) "OPAC Extension to Conventional Data with Bibliographic Expert Systems" (Karl F. Stock); (14) "Teaching End-Users How To Access Online Systems in Libraries and Gaining Access to Online Catalogs through Networks" (Maureen Pastine); (15) "Information Services and Information Utilities--A Management for the User" (Sigrid Reinitzer); and (16) "Information Technology and User Education Management" (Dieter Schmidmaier). A seminar agenda, lists of participants and of participating vendors, and a summary of the conference by Philip Bryant are also provided. (MAB)

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3-922602-05-3 (out of print)

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3-922602-07-X (out of print)
continued on last page

Margaret Bourke-White

Universitätsbibliothek Essen

Essen University Library

Information Technology and Library Management

13th International Essen Symposium
22 October - 25 October 1990

Festschrift in honour of
Margaret Beckman

Edited by

Ahmed H. Helal
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13th International
Essen Symposium 1990
Essen University Library

Information Technology and Library Management

22 October - 26 October
1990

Preface

Essen Symposium 90, the 13th International Meeting, held on 22 - 25 October, 1990, at Essen University Library, Essen, Federal Republic of Germany, once again exceeded the expected attendance figures - 120 participants from 17 countries. As in the previous years the International Essen Symposium is the forum bringing together international librarians and library automation specialists to discuss new developments in libraries and exchange ideas and challenges.

The impact of new technologies on libraries and their managers is dramatically changing. Some librarians do believe that new technology alone is the solution to offer better services and is the solution to all of their problems. This year the symposium was held in honour of Dr. Margaret Beckman, an internationally recognized authority on library automation, library management, and library buildings. The theme of the 13th International Essen Symposium was "Information Technology and Library Management". It covered the following topics: libraries as information brokers; management of information services in an advanced technological world (databases, CD-ROM, Optical disks, etc.); role of online catalogues as information utility; management of and within co-operative bibliographic utilities; free or fee information services. In addition, the effects of technology revolution on libraries and their management range from project management, staff matters, financial aspects, inside and outside dependance/independance, and the acceptance in the academic community and by funding authorities.

Margaret Beckman was Chief Librarian of the University of Guelph Library from 1971 to May 1984. That June, she was seconded to the newly-created, University-wide position of Executive Director for Information Technology, with a mandate to coordinate all aspects of information technology in academic, research and administrative programs on campus.

In the early 1970s she was the only woman among the Chief Librarians of the fifteen major academic institutions in Ontario, and as a consequence the only woman member of the Ontario Council of University Libraries. Under her stewardship the University of Guelph Library system gained an international reputation.

The McLaughlin Library building itself, which she helped design in the late 1960s, is still one of the most flexible and functional in North America. The high level of service offered within the library, both in quality and quantity, results largely from innovations introduced by Margaret Beckman.

Since her early retirement from the university, she has been a full-time library consultant. Previously she had held positions as Chief Librarian (1971-1984), Deputy Chief Librarian and Systems Librarian at Guelph, Director of Technical Services at the University of Waterloo, and Children's Librarian, Galt Public Library.

Dr. Beckman is past-President of the Advisory Board on Scientific and Technological Information for the National Research Council of Canada. She served on the Waterloo Public Library Board (Chairman for two years), the Midwestern Regional Library System Board, and has been a chairman of both the Ontario Council of University Libraries and the Canadian Association of College and University Libraries. As well, she is a member of both IFLA and ALA Library Building Committees.

In addition, she has acted as a consultant to some 90 academic, government, and public libraries in North America, New Zealand, Australia, Saudi Arabia and Sweden. Dr. Beckman is a recognized authority in the areas of library management, library automation, and library building design. She has spoken and published widely on all three subjects. She is co-author, with Stephen Langmead, of New Library Design, Guidelines for Planning Academic Library Buildings (Toronto, Wiley, 1971); and with Stephen Langmead and John Black, The Best Gift; a record of the Carnegie libraries of Ontario (Toronto, Dundum

Press, 1984). Her most recent book is Building Libraries : Guidelines for the Planning and Design of Ontario Public Libraries with Beckman Associates and A.J.Diamond Planners (Toronto, Green's Printer,1986).

In recognition of her contribution, Margaret Beckman has received several honours and awards including:

Laurentian University (1990)
Doctor of Letters (Honoris causa)
Canadian Association of College and University Libraries (1989)
Distinguished Academic Librarian Award
University of Toronto, Faculty of Library and Information Science (1989)
Distinguished Graduate Award
University of Western Ontario (1987)
Doctor of Laws (Honoris causa)
American Library Association (1986)
Academic Librarian of the Year
Ontario College and University Library Association (1986)
Award of Merit
Province of Ontario (1975)
Outstanding Woman Award.

Dr. Beckman's long-established activities in library automation are widely known and published. They include development of the original GEAC library system and the University of Guelph automated system for handling government documents which has been adopted by many other libraries as CODOC (Co-operative Documents). Recognition in this area has included an invitation to participate in the SUNY (State University of New York) workshop on library automation held at Oswego, New York, in May, 1974. Her efforts in this, as in other areas, are constantly directed at improving library service to the user. In January 1974, the first issue of the LARC (Library Automation Research and Consulting) computerized Cataloging Systems Series was devoted entirely to the Automated Systems at the University of Guelph Library, and was introduced and edited by Dr. Beckman.

Dr. Beckman's theories of consultative management, actively involving all professional librarians in decision-making and problem-solving functions within the library organizations, were documented in the January issue of Special Libraries. In October 1974, she was invited to be the featured speaker at the annual Allerton Park Institute, sponsored by the

University of Illinois Library School, the theme of which was library management. In August of 1975, Dr. Beckman addressed the 18th Biennial Conference of the Library Association of Australia, and gave a series of invited lectures in Australia and New Zealand. In 1983 and again in 1989 she gave similar lectures on library automation and management in the Peoples Republic of China.

In fact, information technology has become an integral part of the operation of libraries. However, most of the research done has focused on system functionality, impact of machine on staff, and defining the steps to introduce and operate an automated system.

The introduction of advanced technology in libraries to improve the offered services needs and raises some issues for library management. Librarians must play a leadership role in educating end-users how to access available networks and how to keep up-to-date in an online environment. They can introduce an effective user education course based on experience, knowledge, abilities and existing, as well as innovative, methods. In addition, library managers with leadership responsibilities can empower staff members in the new technological environment and upgrading their skills. In other words, staff training is a necessity in libraries employing advanced technology which creates a dynamic and continious organizational change. On the other hand, staff members must learn how to adopt their attitude to technology and modern information access.

The scale of technology ranges from stand-alone systems to highly sophisticated configurations and the programs vary from simple turn-key software packages to very complex programs. In addition, the media collected and used in libraries are unlimited in nature and can be printed or electronic. But the question is, what is the specific information that library users obtain from library materials. This is in turn very important and necessary to design an online system for retrieving information from machine-readable texts. However, it is not right to believe that the information technology revolution would make printed material, bibliographies, and other reference works obsolete or surplus. There is still a lot of information not accessible via information retrieval systems. Bibliographic expert systems are the link between accessible data bases and other non machine-readable resources.

In conclusion, the nature of our recent society is characterized by increasing technological applications. Is there any fear of obsolescence

for libraries as they exist today, or what is the role of libraries as institutions to usher our society into the information age? Without any doubt the future role of libraries depends on innovative organizational and managerial responses to technologies and its adoption.

As in the previous symposia, the papers, ideas, and discussions were in-depth, informative, and thought-provoking. Thanks to all speakers, participants, and vendors who added to the reputation of the symposium and made it a success, and who honoured our distinguished colleague, Dr. Margaret Beckman.

Essen, January 1991

A.H. Helal
J.W. Weiss

13th International
Essen Symposium 1990
Essen University Library

Information Technology and Library Management

22 October - 25 October
1990

Agenda

Monday, 22 October

10.00	Registration
11.00	Vendors presentations
15.00	Opening of Symposium **Ahmed Helmi Helal**
Chairman:	**Ahmed Helmi Helal**
15.15	Has Technology Failed Us? **Frederick W. Lancaster**
16.00	Discussion
16.30	Coffee
16.45	Vendors presentations
18.30	Reception

Tuesday, 23 October

Chairman:	**Erwin K. Welsch**
9.30	The Wheel of Fortune: Academic Libraries, IT and the Re-emerging Past **Alasdair Paterson**
10.00	Management Strategies for Enhancing the Adoption of Technological Innovations **Mary M. Huston**
10.30	Discussion
10.45	Coffee
11.15	Training Issues in Management of Information Services in an Advanced Technological World **Ellen Hoffmann**
11.45	Discussion
12.00	Lunch break
Chairman:	**Look Costers**
14.00	The Next Generation of Information Products **Arnoud de Kemp**
14.30	"Free" or "Fee" Information Resources in Academic Libraries - the Case of Small and/or Developing Countries **Shmuel Sever**
15.00	Discussion
15.30	Coffee
16.00	Providing Scholars with Information from Electronic Books **Frederick Kilgour**
16.45	Discussion
17.00	Vendors presentations
18.00	Bibliotheca Alexandria
19.30	Reception

Wednesday, 24 October

Chairman:	**David Raitt**
9.30	Micro Management: Multi-Tasking and CD-ROM Applications **David Price**
10.00	CD-ROM-Retrieval in Heterogenous Networks - Conceptions, Solutions, Conclusions, and Influence on Library Management **Christian Heinisch**
10.30	Discussion
11.00	Coffee
11.15	Co-operative Bibliographic Utilities as a Platform to Support Library Automation and Catalogue Retroconversion in Local Library Systems **Ronald M. Schmidt**
11.45	Discussion
12.00	Lunch break
Chairman:	**Genevieve Clavel-Merrin**
14.00	Managing Information Technology in Academic Libraries **David R. McDonald**
14.45	Discussion
15.00	Coffee
15.30	Information Retrieval at the University Library Vienna - R D B - the Austrian Legal Database **Renate Niegl**
16.00	OPAC Extension to Conventional Data with Bibliographic Expert System **Karl F. Stock**
16.30	Discussion
17.00	Coffee
17.30	Vendors presentations
19.00	Reception

Thursday, 25 October

Chairman:	**Ellen M. Pearson**
10.00	Teaching End-Users How to Access Online Systems in Libraries and Gaining Access to Online Catalogs through Networks **Maureen Pastine**
10.30	Discussion
10.45	Coffee
11.00	Information Services and Information Utilities - A Management for the User - **Sigrid Reinitzer**
11.30	Discussion
11.45	Information Technology and User Education Management **Dieter Schmidmaier**
12.15	Discussion
12.30	Summing up **Philip Bryant** Close of symposium

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Essen Symposium 1990
Essen University Library

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1990

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Has Technology Failed Us?

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Abstract

Many librarians are obsessed with technology. Some seem to believe that technology alone is the solution to all of their problems. This paper questions whether the wide adoption of computer and telecommunications technologies has had any significant effect on the image of the librarian or the quality of services that libraries provide.

3

Has Technology Failed Us?

Once upon a time, many years ago, I attended a school of library science. I have no recollection that the word "computer" was used in any of the courses there early in the 1950's. It is safe to say that, by the end of that decade, computers had had no significant impact on libraries or information services in any part of the world.

In the space of only thirty years, computers and related technologies have come to pervade the operations of libraries and information centers. In considering what has occurred in this time, it is convenient to divide the activities affected by technology into two major groups: (1) the inventory control activities, associated most clearly with circulation and technical service functions, and (2) activities associated with subject access. Let us look at these further.

Much has happened in automation of the internal functions of libraries and of their resource-sharing activities. Even the smallest of libraries may now have its own computer for circulation and other recordkeeping activities or may belong to some network that offers these services. Multifunctional systems provide comprehensive records on the status of bibliographic items from the time they are ordered to the time they are discarded. Libraries are now linked by vast online networks that make cooperative cataloging a viable proposition, provide up-to-date union catalogs, and greatly facilitate interlibrary lending and other resource-sharing activities. Academic researchers can use their own terminals to search a catalog that represents the holdings of many libraries, can determine the availability of an item in any of these, and can generate a request that will cause an item in any library to be charged to them and subsequently delivered to their offices.

The gains have been impressive. Or have they? What has been their cost? It is ironic that, at the same time that universities have poured money into automation projects, they have in effect reduced other parts of the library's budget, especially materials expenditures. Monographic and serial purchases have both suffered. Libraries are now caught in a vicious circle. More money is spent on automation while the purchasing power of materials budgets declines. This forces increased reliance on

resource sharing and greater expenditure on the technology to make this resource sharing possible. And so it goes on.

In comparison with some other segments of society, the library profession may have been slow to adopt computers. But, if it was late to embrace the technology, it now seems in a mad race to catch up. Perhaps it is running too fast or in the wrong direction. In some places, automation appears almost a goal in and of itself. On the whole, the profession has been neither imaginative nor innovative in its exploitation of technology, and some activities may have been automated for the wrong reasons.

Circulation systems provide a good example. The main reason for automating circulation, in my opinion, has nothing to do with saving time in checking books out, or reducing costs of circulation, or even providing more accurate records on who has what. Instead, the benefit lies in the improved management information that can be derived from an automated system-- patterns of use of various items and categories of items, information that can be used to improve decisions relating to collection development and management and to optimize the allocation of resources. Yet, how many systems have been designed with this uppermost in mind, how many libraries collect this type of information or, if collected, how many make productive use of it?

Rather than having better management information than ever before, some librarians are actually worse off. A few weeks ago I gave a workshop on collection evaluation for a group of public librarians in Illinois. Almost without exception, they get no useful management reports from their automated circulation systems. More serious is the fact that the automated systems have caused them to abandon records they once kept. Most have no record anywhere in a book of how frequently it has been used. Some can tell when it was last used but do not know when it was used before that or how many times. Have these librarians gained from automation? Probably not. Unfortunately, the great majority believe that they have.

Cataloging provides perhaps the best illustration of what one can think of as the simulation approach to computerization. The goal has been more to automate an existing tool than to seek to develop a new and more powerful one. True, the profession has gone from the printing of cards to the implementation of online catalogs. But online catalogs are usually viewed as card catalogs accessible through terminals. Indeed, some librarians actually speak of automating the card catalog. If card catalogs

had never existed, might we now have more powerful electronic tools for access to library resources? Should we not seek to develop new tools, free from existing conventions and traditions, rather than to simulate the tools of the past? The profession operates under too many constraints and fails to question whether the constraints are real or imaginary. For example, since existing cataloging rules were developed for catalogs to be printed in card or book form, are they really relevant within an electronic environment?

Subject access

Since online catalogs accessible to the public--OPACs--have fallen into place, the proportion of searches that are subject searches seems to have increased, and librarians are now enthusiastic about the potential of OPACs for greatly increasing the power of subject searching in library catalogs. Indeed, many investigations on how to improve subject searching in OPACs have already been performed.

This enthusiasm needs to be tempered with some realism. With support from OCLC, I have recently completed a study of barriers to effective subject access in online library catalogs [1]. The study involved performing 51 searches on selected topics in the online catalog of a large academic library - a catalog containing records for about 4.5 million items. The results of these searches were compared with reading lists on the topics prepared by subject experts. If the expert reading lists can be assumed to contain items that are in some sense "the best", the online searches retrieve relatively few of the best items even when broadened so much that several hundred items are retrieved in a search. Of course, many of the most useful items will be journal articles that most libraries have not traditionally included in their catalogs. But it is the monographic items I was concerned with. Many of "the best" of these were not retrieved in searches performed by a skilled person. More importantly, it appears that very little could be done to make these items more retrievable. A more sophisticated Boolean search capability is not the solution since it is rare that more than one facet of a search topic is represented anywhere in a record: subject headings, classification numbers, or keywords in titles. The bibliographic records are just too brief to allow effective subject searches. Storing contents pages or book indexes could raise recall in the 51 searches from about 59% to around 90%, but at a great cost, and would retrieve thousands of items per search rather than hundreds. A very detailed level of analytical subject

cataloging could greatly improve the situation, but this solution would also be very costly. Moreover, it would not provide the complete solution because the relevance of certain items to various topics is unlikely to be seen by any but the subject specialist.

The fact is that library catalogs permit only the most superficial of subject searches. In the first place, they rarely include periodical articles, which are the most important sources of information for many topics. Further, they tend to provide access only at the level of the complete bibliographic item rather than at the level of the subitem (a particular chapter, article, conference paper, paragraph). A book that deals substantially with topic X is not necessarily a more important contribution to that topic than an article in a journal, encyclopedia or handbook, a conference paper, or a chapter in another book. The catalog fails the searcher by providing access to only a small part of the literature that exists in the library on a particular topic. Moreover, the literature for which it does provide some level of subject access is not necessarily the best available in the library on any particular topic. The library catalog, as it now exists, may provide adequate subject access for a small collection--for example, in a school or small public library--or to lead to a few items, not necessarily the best, on some topic, but it is quite inadequate for a large multidisciplinary library, especially one that attempts to support educational or scholarly needs.

Despite popular belief, the transformation of the card catalog into an online database has not significantly improved subject access. Indeed, it may have made the situation worse because it has led to the creation of much larger catalogs that represent the holdings of many libraries. Merging several catalogs into one, when each component catalog provides inadequate subject access, exacerbates the problem, since the larger the catalog the more discriminating must be the subject access points provided. But catalogs have grown much larger without any significant compensatory increase in their discriminating power. The application of the most sophisticated of searching software to any large catalog of the type traditionally used in libraries would make little difference to its performance: the records stored are completely inadequate representations of the subject matter dealt with. In a database providing subject access to periodical titles, such as MEDLINE, a five page item may be represented by ten or twelve subject headings, as well as keywords in titles and abstracts. In contrast, a 400 page book on the same subject may only be accessible in the catalog of an academic

library by two subject headings, the title words, and perhaps a classification number.

My OCLC study was begun in the hope of identifying practical ways in which online catalogs could be made more effective tools for subject searching. However, the results suggest that significant improvements are not possible within the constraints of existing subject cataloging practice. The conclusion that emerges most clearly is that, if one wants to know the best things to read on some topic, there is no substitute for consulting an expert, either directly or indirectly (e.g., through an expert-compiled bibliography).

This conclusion should not come as much of a surprise. Investigations over many years have consistently shown that seekers of information find much of what they use from specialized bibliographies or bibliographic references in items already known, rather than from databases, library catalogs or consulting librarians. The formal subject access tools are not effective in locating all of the literature on some subject and may not locate much of the literature that subject specialists consider most valuable.

Much research has been performed, and continues to be performed, on ways to improve subject access in online catalogs. The results of the OCLC study suggest that the methods investigated, or advocated, that are intended to improve access to existing records (including truncation and word fragment searching, whether applied to titles or subject headings, and other methods of matching user terms to terms in records, as well as all types of searching aids--expanded thesauri, semantic networks, entry vocabularies, or whatever) could have only a marginal effect on subject access, while methods that call for greatly enhanced records (indexes, contents pages, or both) are completely impractical, at least for catalogs of any significant size.

It is ironic that the computer and telecommunications technologies that have greatly improved the document delivery capabilities of libraries may actually have caused a deterioration in subject access. The library profession should accept the fact that catalogs providing access to multimillion volume resources can never be effective tools for subject searching. Instead, it would do well to look for alternative solutions.

Let us now go beyond the library catalog and look at subject access in a broader perspective. Surely here we have made major progress? The changes have been significant. In essentially thirty years we have gone

from virtually no databases in machine-readable form to several thousand, with many readily accessible through online networks. Has this solved the subject access problem? Some people think so and back up this opinion with rather extravagant claims. For example, Michael Koenig [2], writing in 1982, stated:

> We still talk about an information explosion, when in fact we are in the midst of an information controllability explosion (Page 2054.)

He explains this as follows:

> The technologies available to control information are now growing in capability far faster than is the information to be controlled. For the first time we are able to run fast enough so that we will not fall behind as quickly as before. Not only will we be able to stay in place, but we will move ahead (Page 2053.)

Koenig's argument is based solely on the fact that computing power has and is growing faster than the growth of the literature. Evidently Koenig believes that all information access problems can be solved by technology. He is not alone in this.

In fact, it seems to be widely accepted as a "given", by librarians and computer specialists alike, that we have much better access to information today than we did, say, forty years ago. I am not aware that this assumption has ever been tested, much less proven. While technological advances have undoubtedly increased physical access to sources of information, it is very doubtful that intellectual access has improved significantly, if at all.

Information may be no more accessible today than it was fifty or even a hundred years ago because of the growth of the literature, its scatter, and the increasing twigging of knowledge. Clearly, as the literature on some topic grows, it becomes increasingly scattered. This scatter has several dimensions: more countries and languages are involved, more documentary forms exist, and more journals contribute to the literature. As the literature becomes increasingly scattered, its accessibility declines. That is, the more literature that exists on some topic, the more difficult it becomes to identify, locate, collect, survey comprehensively, or search to find items on specific subtopics.

The improvements that have occurred in information handling may be enough to compensate for the growth of the literature but not to increase its accessibility. Scientists today may have about the same level of access to the literature relevant to their research interests as their counterparts of fifty years ago; this, despite the fact that an individual's area of specialization is likely to be much more narrow. Elsewhere [3], I have suggested the existence of a "law of constant accessibility of information": improvements in information handling merely allow us to keep our heads above water; while a particular innovation may substantially improve access in the short-term, in the long-term the level of accessibility remains more or less constant. Evidence exists to support the hypothesis of the constant accessibility of information and to suggest that our technologically sophisticated information systems may not be as effective as we suppose them to be.

I have already mentioned the OCLC study that suggests to me that subject access in OPACs may not be much better than it was in card catalogs. More significantly, Martyn [4] has compared the results of his recent survey of research scientists with the results obtained in a similar survey he performed more than twenty years earlier. The later survey indicates greater awareness of the importance of information, and greater use of information-gathering methods, but no corresponding increase in the perceived usefulness of the methods. More significantly, the number of cases in which scientists discover relevant information too late to be of maximum value to them seems to be increasing rather than decreasing.

Just as disturbing is a recent study by Davison, et al. [5], which reports on the results of searching techniques used to compile a comprehensive database on costs and modelling in information retrieval. Forty different sources were drawn upon and 6098 relevant items were located. Of these, however, about two-thirds were unique to only one source and thus missed by the other 39. Printed bibliographies were found to be the most productive sources and the online search of databases gave the worst results (only 5% of the relevant references retrieved).

Finally, the fact that Swanson [6] [7] has documented several cases in which the relevance of one body of research to another has not been detected through conventional approaches to information retrieval suggests that the information systems of today may be very far from what one would like them to be.

The scatter problem alluded to earlier has several dimensions that militate against effective subject access. It is well known that, as the literature on some topic grows, it becomes increasingly scattered across documentary types, countries, languages and journal titles. It also becomes scattered throughout databases. For example, in 1971 the term "acid rain" occurred in only one database; by 1983 over forty databases contained items on this topic. Moreover, even within a single database, the bibliographic items on some topic may be widely scattered under different terms. Albright [8] for example, found that the literature on certain medical topics was scattered over more than 40 terms in Index Medicus (or MEDLINE).

Library education

If practicing librarians have become mesmerized by the glamour of technology, so have library educators. What is happening in the library schools closely parallels what is occurring in libraries. Computers are becoming an end in themselves. Money is available for the purchase of microcomputers and terminals while funds for other things becomes more and more scarce. A dichotomy is occurring between computer librarians and traditional librarians. Some students only want to take courses that have "something to do with computers."

We are now teaching in library schools what should be taught in departments of computer science or even in high schools. In my opinion, it is not a legitimate function of library schools to teach courses on how computers operate or even how to program them. It is legitimate, and even essential, on the other hand, to deal in a broader way with the effects that computer, telecommunications, and related technologies are having on information transfer in general--their impact on authors, publishers, distributors, and consumers of information products. But this broader perspective is not a separate area of study--it must be integrated within the core of the curriculum. Put somewhat differently, we have a lot of information technology in our curricula but very little information science.

The human element

The glamour of technology seems to have had little positive effect on the image of the librarian. "Consulting a librarian" still ranks consistently low in surveys of the use of sources of information by a wide variety of

communities. In a survey performed in the United Kingdom. Slater [9] mailed several thousand questionnaires to professionals in the fields of engineering, chemistry and insurance. The objective was to study their use of library and information services in the corporate setting. The very low response rate--21% in chemistry, 15% in insurance and 8% in engineering (15% overall)--does not suggest great interest in or enthusiasm for industrial information services. As Slater points out:

> The most likely reason for the poor response...was simple disinterest in the broad subject of the enquiry. In itself, the low response rate may be the first finding in this study of reactions to library-information provision at work--not a high priority topic for the majority (Page 4.)

Respondents in Slater's survey were asked to rank sixteen departments or services within the company in terms of their importance to the organization. Chemists put the library in the tenth position out of sixteen departments and online searching facilities in the fifteenth position. Engineers put the library in the twelfth position and online searching in the fourteenth, while the professionals in insurance put online searching in the thirteenth position and the library in the fifteenth. For those in insurance only sports and recreation ranked below the library in value to the company. For engineers, only sports and recreation, online searching and the canteen (i.e., restaurant or cafeteria) ranked below the library.

Thirty-five percent of Slater's 448 respondents saw the librarian as "passive, reactive, apathetic, dull, boring" and 23% as a "cold, negative personality, aloof, superior, casual"; 22% judged the librarian to be a "generalist (who) only gives superficial assistance" and 21% believed that the librarian "wants to help, but (is) not competent to do so." Sixty-eight percent of her respondents viewed the ideal librarian as "helpful, approachable, accessible, service-motivated."

Is it possible that technology has lulled us into a false sense of security--into the belief that our ability to use computers has made us indispensable to the world at large?

In our pre-occupation with technology, we may be misled into underestimating the importance of the human element as reflected in the expertise of the skilled information professional and the needs and preferences of the users of information services. The importance of the information professional has perhaps been recognized most clearly by Horton [10]:

> . . . exploiting the full potential of the Information Age is going to require a basic rethinking of traditional Industrial Age yardsticks--placing the emphasis on creativity, talent, and brainpower. Those are the real "capital assets" of the Information Economy, not information handling machines. Certainly none of this would be possible without the computer and the electronic chip and satellite and other technological breakthroughs. But their distinctive contribution is still making processes go faster, more efficiently, and reducing the unit cost of information handling. The real payoff is going to come in training and grooming new kinds of Information Age human resources (Page 39.)

And what of the users? If libraries and information centers of the future are to become more responsive to the needs of potential users, they must offer a higher level of information service than they do today and they must adapt to the information-seeking preferences of these users rather than expecting the users to adapt to system constraints. Mick, et al. [11] have addressed this latter point:

> Effective transition into the information age will require switching from information systems that are technology and content driven to information systems that are user driven (Page 355.)

I began this essay by referring to my experience in library school. I have a distinct recollection that around the same time--the middle of the 1950's--the American Library Association published the second edition of a little manual entitled Patrons are People [12]. Yes, in those days we did think of library users. Count the number of books on library users published today. Count the number published on library technology.

What is happening to the profession? Meetings of librarians now sound like meetings of programmers. Over the last few years I have met librarians in a wide variety of settings, in developing countries as well as the developed. Almost without exception, they want to talk about their new microcomputer or the latest program they have acquired. I can't remember the last time I had lunch with a group of librarians and heard one of them actually mention library users. Yes, technology is still glamorous. But let us not delude ourselves into believing that it has had a substantial impact in improving the services that a library provides to its

users, that it has greatly improved the image of the librarian, or that technology alone will increase the perceived value of library and librarian in the future.

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The Wheel of Fortune: Academic Libraries IT and the Re-Emerging Past

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Abstract

The image of the goddess Fortune and her wheel was used, often playfully, by medieval authors to denote caprice and a recurrent movement between extremes in individual experience, as well as embodying the cyclic nature of history itself.

In a similar spirit, this paper teases out some characteristics of medieval information transfer (and changes imposed by the coming of print) which seem to be showing up again at our present technological frontier. Some contrasts, just as instructive, are also made. Topics include standards, elites, information flows, controls, costs and mind-sets.

Reference is also made to Sheffield University Library's Hartlib Project, which exploits electronically and builds scholarly networks around a 17th century archive, thereby fulfilling, after 300 years, some of the aspirations of the archive's creator.

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The Wheel of Fortune: Academic Libraries IT and the Re-Emerging Past

Technological change seems to divide us from even the recent past.

How many of us, entering the world of academic libraries even twenty years ago, thought of ourselves as anything but providers of paper-based information, as "people of the book"? How many would have expected workplace conversation one day to include, as a matter of routine, such topics as spreadsheets, online searching, desk-top publishing, CD-ROM, hypermedia?

But, as we have been made aware, some sort of revolution has overtaken us, a revolution in which the potentials of telecommunications and computing technology have been harnessed and developed in a struggle for mastery over an ever-expanding universe of information.

A favoured symbol for the advent of this age of information technology has been the wave, sweeping away what has gone before. Alvin Toffler discerned three such waves in human history - the first wave being the agricultural revolution which saw the end to nomadic ways of life and the rise of the farmer, the second wave bringing the industrial revolution, and the third the information revolution, this present era of microelectronics, of accelerated obsolescence and constant mental readjustment - of, to borrow another of Toffler's phrases, "future shock".

But the wave, while providing a dramatic emblem, also fosters ideas of abrupt division, of finality, of technology leading change, which I believe to be unhelpful. Revolutions there have been, and more of the greatest importance than are singled out by Toffler, but the story of how human beings have wrestled with the problems of information storage and transfer suggests many more shared concerns and similarities of choice through the ages than the wave model can convey. In our new age of "interconnectedness", we should not lose sight of our connections, even our continuity, with the past. I was reminded that there is something cyclic even in Toffler's divisions when I recently read Marshall McLuhan's words: "Men are suddenly nomadic gatherers of knowledge, nomadic as never before, informed as never before". Perhaps there are waves within waves.

I'd like, however, to try out this morning another image, a model from the European Middle Ages, somewhere back in Toffler's first wave; a model still true to the fundamental meaning of the English word "revolution" - a turning round. The model is that of a wheel - the wheel of fortune [Fig 1].

Medieval writers, searching for a symbol for the caprice and recurrent movement between extremes inherent in human affairs, turned, as so often, to the classical world, whose remnants they ceaselessly revered, adapted and misunderstood.

From that world of Virgil and Ovid comes the figure of the goddess Fortuna, whose wheel propels men upwards and kings into the mud. Often, medieval writers used her playfully, not least because the idea of Fortuna was at variance with an all-powerful God, but her appearance even in the stained glass of church windows indicates how potent the symbol was, how it tended to take on the significance of a law of nature. For the purposes of this paper, the wheel of fortune is dusted off to embody the idea, dear to more than one past age, that history itself is to some extent a cyclic process and that issues resurface and reshape themselves across the centuries, offering similarities and contrasts for our consideration.

This [Fig 2] is another picture from across the centuries, from very late medieval Europe - in fact, a German picture. There is something here that we might call a library, a scholarly library, while somewhere outside universities and their libraries are developing in the shadow of the Church.

Is there anything here we could call information technology? On the face of it, the question is absurd. It will be almost 450 years before a telephone rests on these solid wooden surfaces and almost 500 before a microcomputer is plugged in. But leaving microelectronics aside (admittedly a usual element in definitions of IT), we must ask ourselves a fundamental question: hasn't human history been typified by the continuing application of technology (in the wider sense of man-made solutions) to the problems of collecting, storing and communicating information? Is this not a definitive human activity?

Even the books on the table suggest how far this society has come along the road. Some writers on IT have identified speech as the fundamental information technology; others have argued that the development of writing, freeing the word from its immediate moment of utterance, giving ideas and established facts dimensions in time and

space, was the fundamental breakthrough which facilitated so many other changes.

Writing, in this man's time, was combined with available media to produce the book - and the picture gives examples of the three languages of the Bible. Greek, Latin and Hebrew are not the languages of this German town, they are the languages of a backward-looking scholarly elite and on them are lavished all the care and controls of scholarship.

Nor is this figure a librarian, although the ability to remove a thorn from a lion's paw remains a useful skill for a librarian to have, figuratively speaking. He is dressed as a senior cleric, as a cardinal. He is actually St. Jerome, patron saint of scholars. The Church is still part of the power structure of a society in which, beyond the window, literacy is not widespread, a society which is still largely oral and, in modern terms, overwhelmingly "information poor". This state of affairs may contain elements of the inevitable, but also represents choices that have been made and the values and structures of society that influenced those choices. So our choices as managers of academic services are limited both by those who bring influence to bear on universities and by those who control or struggle to control information and access to it.

What are the values of this other society, glimpsed through the window in the picture? What standards were brought to or imposed on its information handling? What was its mental furniture composed of?

Paradoxically, given the low level of literacy, the book was of supreme importance - or rather The Book , the Bible. Those who could not read were still ruled by its precepts and revered it as an object (so similarly arose a superstitious awe of the computer in more recent times). Therefore, most shared the Bible's contents only by oral report, or from painted representations and carvings in church. The scope for misunderstanding was immense and standards a particular concern. The text of the Bible (and later the texts of other books studied in universities) had to be uniform, while interpretation had to remain on this side of heresy. There was a standard language of scholarship, Latin, which unified the efforts of men, such as the one in this picture, throughout Europe, and eased the path of the wandering scholar, moving from monastery to abbey to university.

Our concerns for networking standards, common bibliographical description formats, universal classification schemes, user-friendly hosts to a multiplicity of online databases etc., would have struck a chord with this

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man, but poor communications, geographical scatter and the time and costs involved in duplicating texts were decisive enough impediments then. Now, when we have largely overcome these problems, we find the outcomes of our own democratic, market-oriented societies lying in our way - rival standards, the marketing of rival systems, the scope for individual choice and national preference.

Now we are a much more literate society and the book (though not the Bible) is still central to our culture. But there is also increasing scope for information (and entertainment) via television and radio to consider, the attraction of seeing events as they happen, of picking up a phone and instantly getting a message across. The technology is no problem - we press a switch, we dial a number.

Already under development are handwritten interaction with micros (doing away with the keyboard as yet another arrangement to learn) and computer voice recognition, bypassing the skill of writing altogether. Video already gives scope for the spoken word to be scanned and re-scanned like written text, and hypermedia is harnessing this. If we wish, if we choose to, we might become societies in which reading and writing are less urgent, less universally fostered skills. Advances in campus information networks involving video, sound, artificial intelligence, may see that fundamental information technology, speech, comes into its own again, as students hold a dialogue with the catalogue, settle down to watch and listen to Shakespeare or Beethoven or catch the lecture recorded by Professor X.

We seemed to have strayed into the area characterised by modern writers as the "mind-set", the mental characteristics and peculiarities of an age. Ours, as we have seen, seems to be nudged constantly into change - indeed the acceptance of change, of knowledge expansion, is part of our mind-set. Much of what characterised the thinking of medieval people has gone; for example, the prodigious feats of memory of the Middle Ages and Renaissance, the disciplines of mnemonics and the "memory theatre".

Other things changed too - the primary recognition of a word through its sound instead of its appearance which made a hubbub of some cloisters as monks pronounced words aloud in order to recognize them, the inability to scan quickly through text (some monasteries issued monks with one book a year and still found many uncompleted at year-end). Now we have developed speed-reading, we carry our arithmetical brain

in a calculator, we regularly grapple with new types of software or electronic gadgets which require a mental adjustment - how long before use of hypermedia leads to sensitivities about where exactly in hyperspace we are? How long (if ever) before we cease to expect text to come in a single linear sequence? And do we think in a flexible way because of the technology, or is the technology possible because we can think in this way? Perhaps Fortune and her wheel can also represent the circular argument.

Back to values [Fig 3]: these are mostly medieval quotes which say something about the values brought to information handling, but one is a twentieth century quote. Can you tell which one?

The last quote is actually a very recent one. Of the others, I do not think that any of this collection of well-known medieval pronouncements on learning does not hold some degree of truth for today's world of information in general and universities in particular. But what did they mean then?

Hugh of St. Victor's words, "Learn everything and you will see that nothing is superfluous", could be a motto for the ultimate hypermedia system. But Hugh was not only referring to the interconnectedness of knowledge, he was asserting the feasibility of individual assimilation of all the knowledge of his time. Knowledge was knowable because it was finite - the Bible and sacred texts, what remained in circulation of the writings of the ancients, and works of interpretation. This was the original knowledge "universe" which lies at the root of the word "university". Now the individual university teaches and researches a sub-set of knowledge, and a continually changing sub-set at that; academic libraries abandon one by one the notion of being a comprehensive research collection, and modify Hugh's words to something like: "Be prepared to access everything, for there is nothing that may not be required". And the more we spend on access, the less there is for materials; the less there is for materials, the more we spend on access - Fortune's wheel as a vicious circle.

For Hugh, knowledge was frozen in time; our present exponential rates of increase would have been seen as literally hellish. It was a question of restating, protecting, glossing what had been inherited. Writing in the margin, making subsets, collections, digests, offering interpretations, were the limits of personal expression for most - another resemblance to

hypertext as a tool for restating, directing, teaching, building highly individualised databases.

If Bernard of Chartres would have been astonished at our knowledge explosion, he would also have been mystified by our wish to verify and challenge established knowledge. Authority, scriptural and classical, was not to be challenged; if the Roman poet Lucan said that there were snakes in the African desert whose bites made you swell up until you exploded, if Pliny reported men with one gigantic foot to be used as a sunshade, this was true, for the Romans had had an unrivalled knowledge of the world.

The superiority of classical civilization in many areas came to be conceded as a matter of course: what gave medieval man the edge was faith, denied to those who had lived before Christ; hence, the image "dwarves on the shoulders of giants", the belief that they could see just a little bit further, could see patterns of interpretation denied to the Romans and Greeks.

Our picture of the past, tied up with our ideas of progress, perfectibility and obsolescence tends to be less respectful. Some authors (scientists and information scientists) give the impression that we are giants on the shoulders of dwarves; we look at the past critically and sift out what little has been influential, we even feel lifted higher because we stand on accumulations of what has been discarded. Our libraries are full of a kind of intellectual compost.

Abelard's words "by doubting we come to questioning, by questioning to the truth" are perhaps the ones closest to our own spirit - a recipe for scientific method, a description of the frame of mind which has fueled the knowledge explosion. These words were influential, but also caused trouble for Abelard, who suffered charges of heresy and ran the risk of excommunication.

Hugh of St. Victor's second quote, to the effect that the observable world is a book written by God and should be so interpreted, shows why the spirit of scientific inquiry lay so long dormant. "The study of things for their own sake held no meaning for the thoughtful man" says Emile Male in his book The Gothic Image - and for "thoughtful" read "literate". If there were searches, if there were discoveries, these lay in establishing the ways in which each object, each fact, revealed God's truth. All information was ultimately to be used, at least to the minds of the clerical elite who controlled so much of it, in a search for the ultimate truth, in

finding everywhere more evidence of how they were expected to live their lives. Scientists have not all abandoned the notion of the guiding hand of a deity, but God is rarely credited as a co-author in the world's periodical literature. No problems with copyright for Hugh and his ilk, incidentally; God was the copyright holder and man had the right to replicate without fee.

The last quote by Ted Nelson, guru of hypermedia, wittily uses the model of a religion-dominated society to express the chaos of enthusiasms and loyalties within modern IT, where "each sect brings its own presumptions". He goes on to say that "now we hear of a thousand new vying terms and rules, based in the different disciplines and points of view from which people come." This is, of course, actually very unlike medieval scholarly society with its central controls, overriding purposes and ultimate standards.

Let's go back to our scholar in his study. What other controls were imposed on the information he used, or on its use by others?

We should mention a rigid censorship, still in place today in some countries but generally recognized in the West as inimical to what libraries represent. Security was another urgent consideration, the book as an object being very valuable (200-300 sheep skins, 1600 hours of copying to produce a Bible, plus often ornate bindings). Our churchman in the picture could not have lightly ventured into the forest on his own carrying a volume. A loan of a book from one religious foundation to another, or to individuals, often involved a fee, or the signing of legal indentures; penalties for non-return could be dire and extended to the ultimate sanction of excommunication, a level of influence libraries have not aspired to since. There was also the chained library, a confirmation that these were dangerous times for animate and inanimate objects - and that the loss of a unique copy meant the loss of that copy for all Christendom.

Security remains with us as an issue, both in the shape of risk to the rare single volume and the problem, in open access libraries, of constant pilfering and mutilation. Security of buildings and of staff are frequent topics in library literature; we also have massive problems with database security and data confidentiality. There are no Vikings now, perhaps, but plenty of other threats to books and to electronically-stored information, not least the awesome capacity for destruction of modern military technology.

There were also, as we have mentioned, controls our churchman escaped by being neither secular nor, more decisively, poor. The parallel today lies in the question: "How much information will remain in the public domain and be accessed according to social need, and how much the prerogative of those who can pay? In the middle ages, to be poor in a worldly sense was also to be poor in information; you pieced together what you could of world history and the articles of your faith from the bright wall-paintings of the parish church, while the priest intoned the Mass in an unknown language. Our efforts as librarians must be to prevent any comparable impoverishment in our information-rich age; if history does repeat itself in this respect, it will be both as tragedy and as farce" (Paterson, op. cit.)

But will we agree to see it this way? Information retrieval via technology is now our mystery, and every priesthood needs its mystery.

Printing, of course, eventually brought cheaper, more plentiful books. But the changeover from manuscript to movable type shows some interesting stages for us, with our choice of technological routes out of the present.

The prerequisite for printing was a surface to print on. In other words, paper needed to be already established within the manuscript culture. This presupposed (as with the silicon chip which drove the dizzying advance of the microcomputer) competitive pricing, production standards and guaranteed supply to the market. Vested interests, e.g. the parchment industry made this difficult; nor were those who held power easily convinced that the documents and charters from which they derived their power and through which they enforced it could be entrusted to such a flimsy medium. Banks and businesses went through this debate with computers and, earlier, the use of telecommunications in a business context; the path to the electronic library is littered with similar debates, breakthroughs and steep learning curves - and early retirements, though not always to monasteries.

Then, why movable type? Paper, once accepted, offered a smooth surface to any means of making an impression. This picture, I must now reveal to you, is arguably not medieval at all, being produced by Albrecht Durer for a book printed in 1492. The scene it shows is however traditionally medieval, and the medium is the woodcut. For a time, even after movable type, whole books printed from wood blocks flourished, selling to the not so literate, with few words and many pictures cheap to

produce. Had Europe's earlier development of written languages not been alphabetic, had there been systems of ideogrammatic representation as in Chinese, woodcut technology might have been adequate.

So one development brings forth another and stifles a third, as the wheel of fortune spins. What does the wheel have in store for our technologies, for microfiche, for the CD-ROM industry - or indeed for the librarian as an information intermediary?

When print did arrive in Europe, in the fifteenth century, some were profoundly sceptical. Again the pricing issue (including costs of tooling up) was crucial, and for some time (in Ireland, for example, until the nineteenth century) it was still more economical to hire a scribe to make copies of a printed book; others made copies because they did not think the technology and its products would last. The very appearance of the printed book, its size, collation, font etc., was still very like that of the vellum codex, until it gradually became more portable, grew a title page, was paginated, divided into chapters, annotated - in other words, fashioned into a better tool. One thinks of modern academic libraries, choosing online systems for the first time, realizing that they do not need to select the option that resembles most closely existing manual procedures.

Academic libraries, it might be argued, still remain largely, despite everything, what they have always been - volumes, however produced, arranged by one of several methods on shelves in a building called the library. Yet, what we are now said to be confronting is the death of the book. We can see how this might come about. The question is, does a critical mass in society want this change along with the developmental efforts, the mental readjustments it implies? If so, present trends toward increased power and miniaturisation could result in a pocket CD-ROM device with capacity for a working library, a student's collection, produced perhaps by the student's university, feasible before the century ends. If that or a similar path is followed, if the electronic journal flourishes, the paper-based book and journal may wither and go the way of the stone tablet, papyrus roll, vellum codex. Technology already offers long life, huge storage capacity, fast retrieval and increasing portability; friendlier user-interfaces, easier browsing are coming - now cost, depending to some extent on demand, is crucial. The possible end of printing and its replacement shows some resemblances to the changeover period between manuscript and print, but I have a feeling that the book will be around as an important information technology for a long time yet.

Let me finish, however, by skipping 150 years and saying a little about a research project at Sheffield University which connects past to present in a most satisfying and resonant way not unworthy of Fortune and her wheel - continuing, in a sense, a scholarly cycle.

The Hartlib Papers, located in the University of Sheffield Library, form a unique database of seventeenth century concerns. Samuel Hartlib was a Prussian immigrant to England who corresponded indefatigably, whose circle included contacts with the great names of his era - Boyle, Comenius, Cromwell, Descartes, Pascal, Milton, Wren - who planned educational reforms, collected the papers of other savants and contracted out his services as an information searcher and provider - including an information-gathering service for the Cromwellian government during the Interregnum following the execution of Charles I.

Topics covered in the archive range from military science to librarianship, from astrology to horticulture, from architecture to medicine, from silkworm-rearing to Pascal's computer [Fig 4] - all in all, a fascinating and invaluable window on the intellectual concerns of Hartlib, his circle and his times, some 25,000 manuscript sheets.

Hartlib himself was the victim of a lack of patronage, an inability to make money, and in particular the insufficiency of contemporary technology to realize his ambitions for amassing and disseminating information, fostering international contacts and building "universal enlightenment". Hired scribes copied documents, letters were carried by ship and across mountain passes, but time, space, storage, access and cost proved insuperable.

Now, aided by grant assistance from the British Academy and the British Library, a number of initiatives making use of the latest developments in IT have been set up under the umbrella of the Hartlib Papers Project, jointly directed by the Library and the Departments of English Literature and History.

These projects include a complete transcription of the archive using full-text retrieval software, working towards an electronic edition (online and on interactive optical disc); a hypermedia demonstrator of a portion of the archive (on bees and bee-keeping, featuring plans by Sir Christopher Wren for a high-rise beehive); and a multimedia demonstrator, using a portion of the archive on garden history to develop library staff training programmes (how faculty do research, the reference interview, literature searching, personal interaction).

There is enormous satisfaction and excitement in resuscitating, as the most up-to-date scholarly tool, an archive typical of so many passively received and stored unexploited by academic libraries across the years. In addition, Project members are able to feel that, through the evolving technology, they are finally realizing Samuel Hartlib's goals of unhindered transmission of ideas and information between scholars. Coincidentally, dismantling of European divisions has permitted a programme of visiting research fellows from Czechoslovakia, with one of whose most celebrated scholars, the educationalist Comenius, Hartlib had an extensive correspondence; Hartlib's own papers have thus played their part in re-establishing the kinds of scholarly contacts they chronicle. The wheel of fortune continues to spin.

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[Fig 1]

[Fig 2]

INFORMATION

LEARN EVERYTHING AND YOU WILL SEE THAT NOTHING IS SUPERFLUOUS

(Hugh of St Victor)

WE ARE DWARVES PERCHED ON THE SHOULDERS OF GIANTS

(Bernard of Chartres)

BY DOUBTING WE COME TO QUESTIONING, BY QUESTIONING TO THE TRUTH

(Peter Abelard)

THE WORLD IS A BOOK WRITTEN BY THE HAND OF GOD

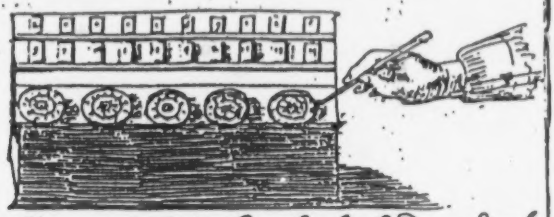
(Hugh of St Victor)

EACH SECT BRINGS ITS OWN PRESUMPTIONS

(Ted Nelson)

[Fig 3]

ye line of which I should be glad to see a draught of a little device which was inuented ye England some 20 yeares past— beeing a little board w^th copper things to runne w^th the finger on case-wormes ... this ye Instrument here at Paris



The Boxe is of Elme, nine foot in length, 3 inches broad, according ye length: The wheeles are of Copper: and seeme as to many Dialls or circles, set with numbers 1. 2. 3. 4. 5. 6. 7. 8. 9. 10, the two vpper above are copper round things, wherein appeare little white pynes set with Cyfers. when the hand stoppes at a Stick the wheeles below stop little round things above runne according the whole Sume: moues, by 100/m. 1000, or more/ the Calculating desired ye make suddainly: The Boxe containes 100 wheeles which moue according the hand moues the vpper most wheeles, —

But a man must first be exact ye obseruements before he can make vse of this Instrument, which cost 5 pistols and no rules of these can be made but by two sphæres Instruments which are not portative, and Grafine a Rare Inuentor hath taught, and drawn: put them ye Stone boxe was the old Prima of Orange were to long and let us proceede in the ordinary readely way:

Now for what you have payed for porrage I am sorry my friend Ran was so ill a diet w^hout necessary many charges

Hartl. 16. 10/2/13

[Fig 4]

Management Strategies for Enhancing the Adoption of Technological Innovations

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Management Strategies for Enhancing the Adoption of Technological Innovations

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Abstract

The "Information Age" has become accepted nomenclature for describing the increasingly technological nature of our society. As we approach the third millenium, the part libraries will play in this age is still unclear. Many assert they are the institution to usher society into the Information Age, while others maintain that the library as we know it is headed for obsolescence. This paper will acknowledge both these viewpoints, while proposing that the future role of libraries depends on innovative organizational responses to information technologies. These inevitable changes will necessarily transform library institutions as we know them today.

The Information Age is both a state of mind and a state of work. As a microcosm of the larger society, employees in contemporary libraries must function successfully in an environment of accelerated technological change. Their workplace responsibilities have - in a very short period of time - been transformed by improvements in the technology for storing, organizing, and accessing data. At the same time, both in and out of libraries, access expectations have increased, without the broad-based education necessary to enable literate information handling. In short, many

developed societies today have become data rich but information poor.

To prepare for appropriate organizational realities in the 1990s, employees in libraries must collaboratively forge working hypotheses about institutional roles in the electronic information environment. Through visionary leadership, today's managers must facilitate participant-rich processes which empower staff members to "learn their way to understanding" how their organizations can best contribute to modern information access. Through upgrading analytical skills and updating technical competencies, library employees can transform their organizations into dynamic, inclusive entities capable of ushering society into the Information Age.

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Management Strategies for Enhancing the Adoption of Technological Innovations

Introduction

When George Orwell (1949) penned his now famous phrase "freedom is slavery," he was not thinking specifically about the emergence of a sophisticated integrated information retrieval system. Yet, his dystopian vision of a world where choice results in an individual's confusion and anxiety presages at least one of the critical issues emerging from our current quest to provide easy and transparent access to a wide range of information: making choices. Today, this problem is exacerbated, for we live in a world that is "data rich and information poor." (Wurman,1989)

The focus of this paper, therefore, will concern managerial strategies for cultivating effective choice-making by library employees working in increasingly complex information environments. The guiding thought for the following discussion is attributable to Goethe, who said in 1810, "The modern age has a false sense of superiority because of the great mass of data at its disposal. But the valid criticism of distinction is rather the extent to which man knows how to form and master the material at hand." (Vagianos and Lesser, 1988, p. 120) Though nearly two centuries have passed since Goethe penned these words, his observation remains true today. Though a wealth of information is now accessible through modern technologies, its value can best be understood by the actual application of information resources to library decision making. Such a perspective assumes that the adoption of innovation can best be furthered by visionary, facilitative managers who prepare for the best possible future by fostering the spirit of inquiry within their organizations.

Changing Information Contexts

Libraries have traditionally been seen as storehouses of knowledge and librarians as the keepers of that knowledge. Until recently, libraries housed the universe of knowledge contained in books. Reading was not perceived as being an outward-directed activity aimed at improving one's physical state or social standing. Rather, reading was an inward-directed activity designed to improve one's inner being by providing the tools to become mentally and emotionally cultured. It was the librarian's task to

provide access to the recorded knowledge through the techniques involved in acquisition, organization, storage, and retrieval. The librarian's role was one of educator, as manifested through the choices made in the materials presented to library users.

In the modern era, however, the emphasis has shifted from knowledge per se to information. The information explosion has eliminated the potential for acquiring universal knowledge. Today, "getting the most relevant knowledge means getting that part of the whole that will lower one's uncertainty and enable one to proceed" (Miksa, 1987, p. 6.) In these times of easy access to unprecedented volumes of information, even this represents a considerable challenge.

Fortunately, there has been a technological revolution as well, which has transformed the way data are stored and retrieved--and, increasingly, published and delivered. Now individuals can retrieve information through specific queries to computerized reference systems. Technology has so expanded access to information, wherever it may be housed, that the systems for transferring information has become far more important than collections of material in individual libraries.

As librarians are increasingly influenced by the emerging technologies associated with the Information Age, they have, in turn, changed how they practice their profession. As increasingly digitized libraries become increasingly capable of supporting individuals' queries globally, elaborate "information literacy" among both librarians and users has become necessary if the new technologies are to be employed in the extension of people's understanding and, ultimately, to contribute to their enablement (Miericke, 1991.)

The underlying foundation of information literacy is an understanding of the communicative purposes driving information creation, retrieval, and transfer. Therefore, the information systems available through libraries must ultimately be understood, at one level, as manifestations of social knowledge producing systems. More immediately, they must come to be understood as potential extensions of individuals' own information universes (Huston, 1990.) This, in turn, requires that both librarians and users assume positions as learners in which they "learn their way to understanding" how to make successful connections between information needs and information resources in today's expanded, networked information environment.

Technologically Transformed Environments

Just as we are shaped by the workplace culture, so too are we profoundly influenced by the tools we use. "In this sense, technology is not and never can be 'neutral'. It shapes its users' minds" (Vickers, 1983, p. 8.) Technology is not inert. Technologies transform the objects of their application in fundamental ways. New relationships are created among the elements and activities into which technologies are introduced. Relationships between work transformed by technology and those who perform that work are altered in significant ways.

This is particularly true of modern, electronic technologies which are far more acute and pervasive and less predictable than earlier tools. Traditional technologies served only to amplify the power of individuals' muscles and to extend the acuity and reach of their senses (Weisenbaum, 1976.) Modern communication and computing technologies, on the other hand, more closely resemble an extension of the human nervous system (McLuhan, 1964.) Their influences are, therefore, considerably more profound. It follows, then, that significant changes will result from the introduction of such potent technologies into the activities of an organization. These consequences must be carefully managed.

Variable Psychosocial Consequences

Although the introduction and use of new technology is becoming increasingly commonplace in today's organizations "as they seek to improve services and streamline operations, technological advances have tended to overlook one essential factor required for successful implementation, namely the human component" (Morris and Barnacle, 1989, p. 84.) For instance, technological innovation may affect the amount of stimulation or tension in a work assignment, as it relates to change in the variety of tasks and by the opportunities for application of personal knowledge.

In investigating the latter implication of computerization, some researchers have studied individuals' convictions that their task execution was being controlled by automated equipment. Such a notion relates to a broader concern about employees' experiences of time and performance, as altered by the implementation of automated processes (Bradley, 1989.) Technology can challenge the importance of employees' intrinsic performance standards vis-a-vis new systems' extrinsic performance requirements. As this example illustrates, the manifestations of

psychosocial consequences can be pervasive, affecting organizational structure, work content, individual influence, communication patterns, management role, working hours, and wage patterns (Grahn and Nilimaa, 1989.) It is clear that technological innovations will have an effect on employees.

Employees, in turn, can be expected to have an impact on technological innovations. Relatedly, the methods by which they are introduced to innovations can significantly influence how employees perceive system attributes and, in turn, whether they adopt innovations. It follows, then, that the human implications of computerization must receive careful attention, for "the principle resources by which any organization achieves its objectives are its human resources who, even with new technology, are the most versatile and adaptive resources available" (Eason, 1988, p. 47.) Successful implementation efforts, therefore, must provide "not just a technical infrastructure for the organisation but [also] a socio-technical structure which not only delivers technical systems but also the human support necessary to develop and maintain the systems" (Eason, 1988, p. 221.)

Toward the Convergence of Purposes

A fundamental understanding of organizational change must guide its management. A particularly useful model for this purpose is the congruence model developed at Columbia University's Graduate School of Business (USA). This model will structure the first portion of the following discussion. Because it is also useful to have an operational methodology for facilitating appropriate adaptation of organizational behavior, the second part of this discussion will consider soft systems methodology, as developed by Lancaster University's Department of Systems and Information Management (UK). The outcome of this process of guided inquiry will next be discussed in terms of cognitive flexibility, as elaborated by researchers at the University of Illinois at Urbana-Champaign (USA). These theories can offer insights into the facilitation of responsive, purposeful organizational change.

Systemic Congruence

From a systemic viewpoint, an organization can be understood as a system with four interacting components: the basic work accomplished by the organization and its parts; the characteristics of the individual

employees; the various formal structures and processes that constitute the infrastructure to support individuals' performance of the organization's work; and the informal organizational structures including the various relationships that exist among individuals. The "congruence model" postulates that the organization functions most effectively when there is congruence, or proper fit, among its parts. Since the system seeks to maintain equilibrium among its parts, changes in any of its components are inevitably reflected in the others because of their interactive nature, and the need to maintain balance among them (Nadler and Tushman, 1981.)

Therefore, change introduced into such a system is a perturbation. The system responds by generating energy which seeks to restore its internal equilibrium. Seeking to reestablish a balance in the system, then, is an intrinsic part of the process of change. If the transition is well managed, the adjustment can enhance the success of an organization in fulfilling its institutional purposes (Malik and Probst, 1984.) Such adaptation has both a technical and a social aspect. The technical aspect of change is the sum of the specific modifications in activities. The social aspect of change is, more ephemerally, the way those affected by it think it will alter their established relationships in the organization (Lawrence, 1975.)

Cognitive Flexibility

The development of automated systems has matured sufficiently so that the current imperative concerns designing appropriate organizational structures that will operate optimally when new systems are introduced into them. Since organizations are comprised of individuals, it follows that needed change can only be achieved if employees actively participate in adoption and diffusion of innovations. This, in turn, requires cooperative, knowledgeable people.

Heightened decision making abilities among employees are required by today's organizations in order to dynamically respond to accelerating changes in their external and internal environments (Lundquist and Huston, 1990.) During these times of rapid technological change and unprecedented information flow, the most useful employees will be those who possess flexible problem-solving skills. The key to enlisting individuals' cooperation is participation, a feeling that their opinions are "respected because they themselves are respected for their own worth" (Lawrence, 1975, p. 393.) In other words, management processes must be

such as to insure a maximum probability that in all interactions and all relationships with the organization, employees will, in the light of their background, values, and expectations, view the experiences as supportively building and maintaining their sense of personal worth and importance (Likert, 1961.)

For participation to occur, employees must possess heightened ability to influence the nature and direction of change. The change effort, then, can be experienced as self-motivated and voluntary. To accomplish this redistribution of power requires that organizations transcend traditional decision making boundaries by preparing employees, at all levels, for "more innovation, enterprise, and initiative" (Kanter, 1983, p. 17.)

Throughout the transition process, open communication among employees and between employees and managers is crucial to empowerment. Since individuals base their decisions about intentional actions on their understanding of situations, sustained dialogue can produce stimulating information which can feed the thought processes of participants. When meaningful information is successfully exchanged, it can produce more imaginative, newer interpretations of the topics under discussion. In this way, problem solving possibilities can be expanded as staff "learn their way to understanding" through consensual agreement. Through such collegial dialogue, decision making among individuals can yield purposeful organized action.

Systemic Synergy

Through usage of a structured process of inquiry (Checkland, 1981), managers can facilitate their employees' adaption to the significant changes characterizing modern organizational environments. Through guided development of critical inquiry, participants can attain a deep understanding of content material, apply critical reasoning skills to its explication, and utilize the resultant insights in diverse applications (Spiro, 1988.) Together, employees and managers can teach one another how to change in response to changing circumstances.

As organizational members construe and reconstrue topics under investigation, they will develop both an improved understanding of their personal viewpoints and also others' viewpoints. From this perspective, individuals' cognitive structures could be portrayed as systems that create, motivate, and direct searches for relevant information, even as they are influenced by external information from others (Huston and

Miericke, 1990.) In the process, employees can learn about organizational events which generate, for them, relevant information as to where information resides, how to access it, and how to utilize it. Such well-managed exchanges can cultivate participants' information literacy.

Managerial Leadership

Responsibilities to encourage creative organizational behavior, a manager must embody the emergent "hybrid qualities" (Keen, 1981, p. 31) necessary to conduct an interactive debate among participants through "co-constructive conversations" (Forsgren, 1989.) Additionally, the manager must possess the intellectual vision to identify the essential properties of meaningful ideas and issues.

The manager in this process is responsible for clarifying participants' perspectives on systemically desirable and culturally feasible changes. To function effectively in this context, an individual must cultivate a number of qualities, including comfort with change, clarity in direction, and thoroughness in preparation. Such a leader would employ a participative management style, well executed, with excellent interpersonal communication and group facilitation skills, including persuasiveness, persistence, discretion, and patience (Kanter, 1988.)

The process itself becomes an inquiring system where participants learn about facets of the organization and, additionally, through ongoing problem solving, acquire cognitive strategies transferable to decision making in any of the three phases of organizational innovation: project definition, coalition building, and action planning. Through involvement in these processes, individuals can explore information-rich aspects of their organization and its context, so as to enhance their information search, data analysis, and application abilities--and thereby their "competence, communicativeness, concern, courage, and creativity" (Ackoff, 1978, p. 3)--in the workplace.

Literate Organizational Infrastructure

Successful change is heavily people-dependent and, to a large part, influenced by participants' "social competence" (Hård af, 1989.) The difficulty of achieving successful communication is further complicated because our social worlds are broad and relevancy judgments about appropriate information and its presentation can therefore differ from one individual to the next. However, under the sensitive guidance of the

library manager, employees can learn to match relevant contextual variables with appropriate communication strategies to achieve desired organizational outcomes.

If these competencies are cultivated throughout the implementation process, managers can thereby create ongoing learning environments. Through initially structuring inquiry, in which the manager selects relevant elements of organizational structure, organizational process, and situational climate, employees can learn how to become informed themselves. For example, they can also learn how to inform others--such as library users--in real-world problem situations. Such an environment can be conceptualized as a Continuous Organic DEvelopment (CODE) system (Lundquist and Huston, 1990) in which innovation is a product of an organizational culture (Downes, 1990.)

The resulting empowerment could produce creative vitality in the work culture of an organization. Ultimately, through acquiring generative information literate skills, participants could create exciting visions of the contributions that they might make in their organizations, working proactively with information, both individually and collectively, in ways that insure substantive, procedural, and psychological satisfaction. "That is, everyone in an organization should constantly be thinking through what information he or she needs to do the job and to make a contribution" (Drucker, 1988, p. 49.) Individuals can best adopt this orientation through purposeful, collaborative decision making in which the "organization steadily learns about and reconstitutes itself, in a changing environment, rethinking the meanings it attributes to its world [through] a process by which the nature and context of the required information flows can be rethought and reprovided" (Checkland, 1988, p. 246.)

Systems Thinking, Systems Practice

In turn, so as to maximize the potential of emerging information and communication systems, managers must possess the conceptual frameworks necessary for "orientation as to the important factors of the system, the relationships among these factors, the types of change among the system factors that offer likely improvement in performance" (Engelbart, 1963, p. 2.) Although these words were written over thirty years ago, they foresaw that augmentation of human intellect will have to

involve changes in working environment, thinking skills, and work methods.

The heightened challenges of working in today's complex information environment requires individuals who are capable of comprehending complex situations, isolating significant factors, and solving complex problems. Choice-making, in turn, requires a theoretical basis--derived from personal experimentation--that provides a better understanding of both the human activities in which technological innovations can be used and the potential contribution of technological innovations in these activities. Such a conceptualization can guide individuals in the determination of "the matters that really matter for ... usability" (Nielsen, 1989, p. 239.)

Librarians will increasingly find themselves innovatively creating applications for enhancing current levels of information access through emerging technologies. Such problem solving activities require considerable serendipity, ingenuity, and vision, applied in the context of "a clear idea of what one is trying to accomplish and its importance" (Raitt, 1989, p. 99.) Through working cooperatively and interdependently, individuals can better assess the relative advantage, compatibility, and complexity (Rogers, 1983) of technological innovations. Such informing activities can best support librarians' professional choice-making in today's complex information environment.

Additionally, the resulting heightened understanding among librarians will provide the necessary framework for guiding users' searching activities. After all, librarians are the agents through whom the new technologies will not only be made available to users but from whom users will gain an understanding of and an appreciation for the vast storehouse of information accessible through appropriate technology (Callahan, 1991.) In order to facilitate users' exploitation of present and potential access tools, librarians must themselves be conversant with the physical tools and the intellectual strategies by which to gain access to needed resources.

More specifically, librarians must understand systems' purposes well enough to assess technological innovations, develop an understanding of how to formulate effective search strategies, develop improved techniques for soliciting users' needs (Grahn and Haupt, 1990), and help users "digest and assimilate in terms of their original needs the information that is retrieved" (Miksa, 1987, p. 13.) These competencies

for information literacy can best develop through ongoing learning. In other words, the contemporary librarian operating in an increasingly complex information environment can no longer be content with merely providing data organization, storage, and retrieval. Rather, the modern information professional must actively participate in harnessing the newest technologies to serve users' needs (Beckman, 1982.)

Contemporary Managerial Challenges

It follows, therefore, that because no other change in history has offered greater challenges than the emergence of the Information Age, managers must facilitate the transformation of the organization. The aim of the transformation is to "donate the process to the participants" (Checkland, 1986, p. 2.) Today's information professionals must learn how to comprehend when information is needed and have the ability to locate, evaluate, and use it effectively so they can enable others. They must also remain knowledgeable about emerging technology, so they can appropriately guide innovations which enhance users' information access (Raitt, 1991.) As facilitators of this change, managers must create nurturing environments conducive to reflective action.

If we choose to lay the groundwork for change, the possibilities will be limited only by our imagination (Huston and Grahn, 1990.) Conversely, to fail to do so is to invite Orwell's dystopian vision.

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Training Issues in Management of Information Services in an Advanced Technological World

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Abstract

This paper examines the reasons why enhanced staff training is a necessity in libraries employing advanced technology. The rationale is grounded in recent writings on organizational change, stress in the workplace, the social aspects of automation and concepts of service organizations. The paper also provides an inventory of managerial issues in designing, implementing and maintaining training programs for the varied and complex automated systems in contemporary academic libraries. Managerial decisions must be made in mounting a broad-based training program for information services in a technological world.

Staff Training Issues in Management of Information Services

In the intense information technology environment of contemporary libraries, staff training must be as important and continuing an activity as collection development or reference service. An experienced, and perhaps weary, librarian concluded that "for training to flourish in any organization, it must receive constant attention.... Training left to whim usually will not happen, and training without preparation is a waste of time." [1]

The active nurture of staff training programs is a critical management responsibility in an advanced technological world. Library management must, first, identify WHY staff training is important. Then issues regarding WHAT information technologies require training programs, FOR WHOM training is needed, BY WHOM training is provided, WHEN training should occur, and HOW training should be conducted can be addressed. The question HOW MUCH must be asked with each of the other issues, for staff training programs demand the investment of human and financial resources. [2]

WHY

Four important roles for staff training programs are: to enable library staff to effectively utilize complex automated systems; to help library staff to manage continuing, rapid change in automated libraries; to implement a frontline service strategy; and to aid employee recruitment and retention.

Information technology in our libraries is both complex and pervasive. An integrated online system requires a higher standard of performance, and thus a higher standard of training than was necessary for satisfactory performance with manual and batch operations or small-scale online sytems. It is necessary to move from training by whim to training by requirement, from ad hoc to structured training, and probably from local to centralized training. The complexity of integrated online systems is not normally the result of design flaws, but of extensive additional capabilities for information access and management. Admittedly, the rigidity of current automated systems may at times require attention to

humanly meaningless detail. The standardization and formalization of operations required by advanced automated systems, means that informal and improvised solutions aren't sufficient. Furthermore, integrated systems require additional training because there is more information available to each staff member. Circulation assistants can provide information about books on order or records created by acquisitions assistants can affect the work of cataloguers.

Information technology is pervasive as well as complex. It affects most parts of the daily work of most of library staff.
There is too much to learn and the learning is too essential to depend upon good intentions. Failure to learn and to effectively use available technology seriously inhibits the job performance of both the reference librarian and the order department assistant. A systematic training program is necessary to assure that library staff have the skills to carry out all parts of their work.

The constancy of change is the second important justification for active staff training. It is no longer possible to learn a library function once and carry it out in the same way for a decade. When I started working, there were cards in the circulation file for books checked out in 1938; the circulation system had been stable for 30 years. In contrast, the library where I now work has had four different circulation sytems in 20 years. In the current year the York University Libraries will conduct training for a major enhancement of the online catalogue, for the University of Toronto's online catalogue which is accessible from selected terminals at York, for Kurzweil and other facilitative devices for disabled users, for a new release of word processing software, and for a microcomputer retrofit of hard discs. These are changes which affect large numbers of library staff. In addition, there are training programs for departmental requirements such as CD-ROM databases in reference departments and an online booking system in the media library.

The pace of change is too rapid to assume that people can and will learn when there is time. And the changes are too numerous to assume that people will learn what they need to know. "Watching Nelly" will always occur, but there must be systematic training programs in addition to informal, show-and-tell training.

It is well established that positive as well as negative change is stressful. Change creates uncertainy. It is that uncertainty and lack of security that cause resistance to change for most adults. There is a feeling that the

rules changed in the middle of the game. Training is the best way managers have to reduce the uncertainty that change brings. Good training can provide the competence and the control to adapt to change. Furthermore, a habit of training can engender the confidence that with changes will come appropriate training.

It is possible that exposure to new ideas and mastery of new skills can give staff members confidence in their abilities to respond to new situations and thus be more receptive to future changes. Sheila Creth points out a paradox inherent in much information technology training. [3] People are trained for the task at hand and to do that task in a defined way. At the same time, good training seeks to cultivate an attitude that will enable people to accept new approaches and requirements.

There is another aspect to change which should be recognized in training programs. Automation is a shift from a tangible to an abstract environment. People are no longer moving around in a physical space from the tub file to the book truck to the ledger, but in a virtual or abstract information space. In order to be comfortable and to function effectively, library staff must create new mental maps. There are increased conceptual demands in the automated library. If training is designed to prepare an employee only to perform a specific task or to interact with a specific computer application, the result can be a fragmented vision of the work place which "leaves employees both ignorant of the nature of the library and fearful of exploring outside their immediate areas of responsibility." [4] Comprehension of an abstract information space is a cumulative process; it is the product of a continuing attention to training, not of a single event. As we move toward the "library without walls" which networks make possible, it is increasingly important (and increasingly difficult) to construct new mental maps. How can we have a floor plan if there are no walls?

Support for a frontline service orientation is the third important role for staff training. Writers on service excellence have emphasized the importance of frontline employees and the "moment of truth." [5] When the product is service, quality is necessarily dependent on the person who provides the service. Without comprehensive training, service excellence is more rhetoric than reality, for frontline staff need knowledge and independence in order to take appropriate action. Hendley reminds librarians that library service, not the system, is the objective of training in service. [6] Training must occur in context so that the

requirements of the system do not dominate the needs of the library user. The principles of critical thinking are being incorporated into our bibliographic instruction programs for students; the same principles of formulating, seeking evidence, and evaluating information need to be incorporated into our staff training programs.

Staff recruitment and retention are a fourth reason for training programs. The difficulty of recruitment varies from area to area, and workforce projections are uncertain. However, a recent Canadian survey found that half the workforce would trade higher pay for additional training. [7] It is probable that good training is one way that the not-for-profit sector can compete for good employees.

Training is a major concern of unions. The collective agreement with the support staff at York University includes an article to define technological change, provide for notice and consultation regarding proposed changes, and require that "any employee affected by such technological change shall...be given the opportunity for a reasonable amount of retraining to equip that employee for the operation of the new equipment or procedures...." Management has an obligation to prepare staff to undertake new responsibilities and to provide the conditions for success.

When library management believes that these, or other, answers to the questions WHY staff training are both credible and significant, then it is time to turn to the traditional operational questions of what, who, when, how and how much.

WHAT

There are many information technologies for which training needs to be provided. This selective inventory of information technologies identifies some of the managerial issues to be addressed as training programs are established.

The integrated online library system has been the most obvious new technology in North American academic libraries recently. Each functional module--circulation, online catalogue, cataloguing, acquisitions--requires extensive structured training. The initial training program for cataloguers at York was 35 hours scheduled over two weeks. Integrated means that the parts of the system are related to each other and thus there is also a need for training on how the modules relate. The "overview" training program for our integrated online system helps library staff to create new mental maps. Integrated systems are dynamic

systems; new releases are common and may require additional structured training. An online library system requires continuing training support just as it requires continuing technical support; neither is ever "finished."

Microcomputers have become widespread. All libraries utilize basic business application software--word processing, spreadsheet, database management, desktop publishing, project management. A key decision is whether a library-wide standard will be adopted and supported for each type of software or whether individual selection will be permitted. Staff training and trouble-shooting support are easier with the former choice. It is also a managerial responsibility to oversee who will use the software and at what level. One danger is that professional staff will become overpaid data entry staff, layout artists or hardware technicians. For complex applications it may be more efficient to train a few people to provide central support rather than to mount a general training program. The allure of software application programs should not tempt libraries to skimp on the operating system and hard disk management training which are the foundation for successful microcomputer operations. Online searching is well established in university libraries, and much of the training is vendor supplied. Nevertheless, there are managerial decisions to be made. Whether online searching is to be conducted by a few search specialists, by all reference service staff, or in a blended arrangement, determines how many people need training and at what level. Training for online searching is not a one-time event; there must be resources of both time and money for skills maintenance and upgrading.

Bibliographic databases on CD-ROM are proliferating in academic libraries and bring training obligations. Successful exploitation of CD-ROM products requires a sound understanding of microcomputer operating systems. Training must include both the content or each product or database, and the unique search protocols.

Communications including telecommunications, campus or regional networks, and local area networks, is probably the most difficult area in which to provide training at the current time. There are many players and the environment is volatile. It is difficult to develop mental maps for such a large and fluid information space. Furthermore, in most areas of communication software and hardware are inextricably linked. It is difficult to find trainers with the appropriate knowledge and training ability. Libraries need both "techies" and visionaries, but not in their

training programs. Communications training requirements will not abate in the foreseeable future.

This survey of information technology is conservative, but even so the training and development requirements are formidable. Managers and librarians must recognize that in-house and in-service training cannot meet all the training and development needs for professional staff. Librarians share responsibility for their personal professional development and continuing education and must actively pursue opportunities to supplement library provided training. Few libraries are large enough to provide in-house training and development for technical staff. Library management must be willing to support attendance at the (usually expensive) training events that enable systems staff to maintain up-to-date skills and knowledge.

FOR WHOM

It is tempting, but unrealistic, to conclude that everyone should be trained about everything. However, a relevant and realistic training program begins with a needs analysis. For each information technology product or function, there should be at least a simplified needs analysis to determine who needs to know and at what level of expertise. There is a continuum of expertise that ranges from awareness through novice to advanced, and not all staff members need to operate at the same level. Wilburn has published a self-questionnaire for microcomputer knowledge which assesses levels of knowledge regarding hardware, languages, operating systems and applications. [8] Similar assessment scales could be developed for other information technologies. The needs analysis should consider needs articulated by library staff and managers and an assessment of library goals. This information provides the basis for the allocation of training resources.

Training decisions will have organizational as well as individual implications. Information technology training can change authority relations in the library. Senior staff may be dependent upon subordinate staff or younger professional staff may have more expertise than long-service librarians. If some training is provided centrally, the supervisor is not the sole training source and may have less authority. The need to coordinate multiple types and levels of training requires strong communication between units and among organizational levels. Library management should attempt to anticipate the organizational spin-offs of staff training.

BY WHOM

Training can be conducted by in-house trainers, by external trainers or in some combination of the two.

The two basic models of in-house training are centralized with specialist trainers or decentralized with peer trainers. The main advantages of central training are: consistent, standard quality; more rapid implementation; easier coordination. The major disadvantages are: dependency of local units; lack of timeliness; lack of relevance to local needs. The advantages of peer trainers over specialist trainers are the obverse. The major advantage of peer trainers is that they are in the departments to serve as resource people and troubleshooters. Peer trainers also provide a large pool of trainers for peak periods. When large numbers of staff serve as trainers, it is useful to begin with a train-the-trainer program for them. The two training models can co-exist. York adopted the central training model for word processing instruction and the peer training model for the integrated online library system.

Sources of external training include vendors, consultants, the home institution, workshops, and professional associations. Libraries should take full advantage of vendor-supplied training, but recognize that there are limits. Vendor training will not be linked to local operations and it frequently lacks continuity. Consultants, either free-lance or from another institution, supplement in-house trainers by providing additional staff when staff resources are limited or providing expertise that is lacking. Lack of continuation is the major drawback of reliance on consultants as trainers. Libraries which are part of larger institutions can exploit the general training programs of the parent body. It may occasionally be beneficial to sponsor the technology training workshop of a professional or commercial group locally rather than to send a few individuals to the workshop.

WHEN

It is clear that intensive training needs to be provided when a new system is implemented. There are some guidelines, but few rules, for the decisions that need to be made about the timing of an implementation training program. Training should not occur until equipment is available, for without equipment skills practice is difficult. It is useful to train enough people to form a critical mass who can assist each other. The time for training should be long enough so that the pace isn't rushed and people

aren't overloaded. One of the advantages of training with a long lead-time before introduction of the new technology is that people have a chance to play with the system and integrate the training. Potential disadvantages with early training are that people will forget, that momentum is lost, that false expectations are raised. The advantage of training close to the implementation date is that people can use the new skill immediately; the danger is that there is insufficient lead and lag time. With major training programs, the logistics of schedules must be considered to accommodate departmental requirements, shift- and part-time employees.

Decisions about implementation and related training schedules must recognize that automation isn't the only thing happening in the library. Few academic libraries can schedule training at term- or year-end when student use of the library is the greatest. An implementation date may need to be deferred to accommodate other departmental or library priorities.

The requirement for ongoing training is less obvious, but equally as essential as implementation training. Staff changes--new hires, transfers--are one reason for continuous training. System changes--enhancements, new releases, revised policies--are the other major reason for continuous training. In addition, there are refresher and remedial training requirements. Ongoing training needs will undoubtedly be greater than anticipated.

HOW

The design of staff training programs should incorporate the principles of adult learning. Adults learn best when the learning is relevant and when it allows them to build on experience. Everyone learns best when there is an opportunity to apply the learning, to use the new skill in situations that provide feedback and reinforcement. A reliable formula is "tell, show, do" with the learner having an opportunity to do. Differences in learning style are more pronounced among adults than among children. Training events cannot be individually designed, but they can include a variety of learning methods. Good training includes opportunities to use the senses of sight, hearing and touch because some individuals learn best through reading and others with other senses. Similarly, some learn easiest when proceeding from general concepts to specific applications and others prefer to start with the specifics. Training demands change and, as noted above, all change is stressful. Thus, it is important for training to occur in

a supportive environment, one which recognizes that toleration for uncertainty varies among staff members. Complex training should extend over a number of days or weeks. People need time to unlearn old ways and to be incompetent before they can integrate new methods into their daily activities. An unhurried atmosphere reduces the stress of change.

There is a repertoire of training methods, both face-to-face and media-based. The principles of adult learning do not mandate a single format for training; a comprehensive training program will include a variety of training methods.

Classes or workshops are probably the most commonly used face-to-face training method in libraries. Information technology training workshops frequently include guided practice and controlled simulations. There may be out-of-class assignments. Group discussions are one of the best methods to develop the contexts of information technology and develop the new mental maps that are required. Individual tutoring is the other common instructional method. It will be effective if the training is designed with as much care as if it would be presented to a group, and can be ineffective if it is a passive show-and-tell exercise. In large systems, it is useful to occasionally trade staff between the central library and the branches. It is common for central library staff to be specialists in a few functions and for branch library staff to be generalists in many functions; a temporary exchange can be enlightening.

Staff members who are skillful with and enthusiastic about information technology can be important resource people; their contribution to training should be recognized. Brown bag lunches and interest groups are methods to provide some organizational support for informal learning. Telecommunications was the topic for a brown bag series in the York libraries last year. Currently there is a new interest group on hypertext.

There are a number of media-based training methods in addition to face-to-face training. Printed materials are both common and essential. Most workshop training should include handouts and/or workbooks to serve as reference material after the event. Most information technology products include documentation or manuals. The calibre varies, but they are always a training resource. Newsletters from vendors, user groups, and other libraries serve a current awareness and trouble-shooting

function. Electronic bulletin boards and discussion groups are increasingly important for informal on-going training and current awareness.

Neither audio nor visual nor computer-based training materials have been commonly used for information technology training in libraries. The exception is the microcomputer based tutorials that are included with most business application software which can be used for self-study. The development of effective media-based training is expensive, and to date the library market has generally been too small and the change too rapid to justify the sizeable development investment in training technology. The growing variety of computer-based training technologies may increase the likelihood that major vendors and consortia or networks will utilize more training technology. Among the options are linear video, interactive video, and compact disc.

Most successful training solutions will be integrated solutions, using both people- and technology-based training. Technology-based training can alleviate some continuing training challenges: lack of time, turnover, inconsistent information, cost. Technology-based training is always available and always on site. It is reuseable and provides consistent information. Interactive technologies permit the training to be individualized so that the user, not the teacher, controls the learning.

HOW MUCH

It is difficult to answer the administrator's how much? There is no commonly accepted standard, but experience indicates that the answer won't be small or inexpensive. It was common during the first wave of library automation to skimp on equipment. Underconfigured systems are less likely today, but failure to budget for adequate training for implementation and maintenance is still common. One way to establish a standard is to set a percentage of the payroll budget, commonly 1-2%, to fund training. Another, probably more relevant, method is to set a number of hours or days per year for training. The annual training time will vary among staff depending upon their job responsibilities. Staff with multi-function assignments or in a rapidly changing environment would have a higher training allocation. This standard recognizes that the cost of training includes the time for training as well as the cost of tuition, trainers and materials.

Library managers must acknowledge the cost of staff training. At the same time, managers should recognize that training does not exist in

isolation. Even a well-funded staff training program cannot compensate for an inferior system, for inadequate equipment, for understaffing, for dirty data, or for too rapid implementation. Training cannot compensate for an abdication of managerial responsibility.

There are overhead costs. Training for information technology requires facilities. Hands on training at terminals or workstations is essential, and training should be scheduled so there are no more than two people per station. The training site or sites must be away from operations. The training facility can be shared with other functions or users, but it must be private during training sessions. A data projector greatly facilitates online training. It is nice to have flip charts, white boards. As the amount of equipment grows, it is convenient to be able to store it in the training facility.

Training for an integrated online system requires a test database. A test database reduces conflict between training and library operations. The test database at York is shared by training and programming staff and thus guidelines about what records are in the database and how they will be changed are necessary. A test database reduces risk and the learning environment is less stressful.

Facilities are one of the overhead costs of training. Equipment support is another. The benefits of training are quickly dissipated if monitors are fuzzy, if microcomputers are improperly configured, if printers don't work. Information technologies cannot be implemented without training support, and they cannot be maintained without equipment support.

Change is no longer a transitional stage but a constant state of libraries and information technology. Therefore, training must be a constant activity in our libraries. Consideration of training issues needs to be woven into the warp and woof of decision-making in the management of information services.

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The Next Generation of Information Products

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The Next Generation of Information Products

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Abstract

New technologies change storage, retrieval and communication.

Database structures and online search software originate from concepts which are now, for the most part, more than 20 years old. A whole new generation of stand-alone information products and software packages has shown up.

The variety of media seems unlimited and publishers will have a difficult time selecting the right medium for the right products for the right audience at the right price.

In this paper I will present an overview, including such topics as hypertext, multimedia, CD-ROMs in networks, and licenses versus sales. Is there such a thing as an electronic book and do we want it? What do libraries want and is it manageable?

The Next Generation of Information Products

I am more than pleased to be back in Essen. As some of you will know, I have been participating in the Essen Symposia ever since the very beginning. The early papers concentrated on the role of publishers, booksellers and subscription agencies in the information chain. Later on I focused on library automation, online catalogues, public networks and today I would like to talk about information in combination with new technology.

The Electronic Book

Our chairman, Look Costers, asked me to say a few words about the electronic book. More precisely, he asked: "Is there something like an electronic book?". This is a very interesting question. We all seem to talk about electronic books or even about THE electronic book but how many have seen electronic books and will they, can they, exist? And how do you read them?

At the recent Frankfurt Book Fair (October 1990) there was a special exhibition of Japanese technology; new and pilot products. Apart from a large presentation of CD-ROM, CD-XA, CD-I you could see High Definition Television, High Definition Print, etc. Sony showed the first Electronic Book Player, the little thing that I have in my hand right now. It fits very well in the product range of hand-held stereo cassette players (Walkman), television (Watchman) and compact disc players (Discman). This is the first "Data Discman". It has audio and video output, so you can use a much larger screen than the built-in liquid crystal screen and you will be able to listen to those electronic books that offer both text/data and sound. The battery is rechargeable but you can also use external power (9V). In it is a mini CD-ROM (3.5"). The first 27 electronic book titles have been announced already in Japan. They are mostly dictionaries, bi- and trilingual Japanese-German-English for instance. In the spring of 1991 first products will be announced in North America, and later in 1991 the first European products can be expected. We will probably hear details at the 10th IEPRC Conference in London (June 1991).

As all mass consumer products from Sony, the electronic book player is well designed, easy to use and will probably be in an affordable price range. First indications are between DM 700,- and DM 800,-. The Data Discman may well set a new standard.

Technology

What fascinates me personally and professionally is that different media are, or are becoming integrated in ever smaller computers: Digitisation in combination with powerful central processing. The variety of input facilities (OCR scanning, facsimile, scanning, keyboarding, mouse drawing, sound and video recording, etc.) and output facilities (high resolution colour monitors, laser printers, plotters, stereo loudspeakers, etc.) seems unlimited and is improving all the time. The area of storing and packaging digital information is a paper in itself.

I am currently testing a software package Guide (Version 3.0) that turns my personal computer into a multi-media system. It allows me to combine text and data with images, sound and video, which I, for instance, could use for product presentations or videos, but also for my own information and documentation. I will come back to that in a few minutes.

If we look at recent technological developments we can then only expect many new devices to work with. The Patent Offices record a sharp increase of applications in this area. Unfortunately, most of them are incompatible.

We see already now a whole range of new opportunities for archives, libraries and documentation centres. Professionals, however, worry whether they can afford all or part of this new technology, whether there is a place for it in their environment and how they can offer it to their patrons. Or, is it possible that parts or major portions of this new information technology will go directly from producer to end-user.

An Example

I would like to give you an example of a scenario where we are involved. Most of you surely know the Beilstein Handbook of Organic Chemistry. This Handbook systematically documents all new organic chemical substances in the primary and patent literature. The first two volumes were published in 1881 - and the literature coverage goes back to 1830. The oldest reference found even dates back to 1779. In the hundreds of

volumes published, until now all known organic chemical substances are presented with their structures, their chemical names and many factual data. The work involved is immense and not all libraries could or still can afford this classic reference work, but you will find it in key centres next to Gmelin, Landolt-Börnstein and Chemical Abstracts.

The Beilstein Institute, with the help of Springer-Verlag and generous financial support from the German government, has now put almost all information from the past into what is now called the largest organic chemical factual database in the world. At the moment more than 3.5 million structures and the related factual data are offered. This number will increase to 5 million compounds in the next few years. All of a sudden, with the help of a personal computer, a mouse, a modem and software for searching and communication, it is now possible to draw a structure and search for it or similar structures in the online database. When you have found your structure(s), you are given references to the printed Handbook and you can then go to your library or alternatively download that structure with the information and store it in your computer. In the near future it will be possible to have three dimensional structures and it will become possible to enter the structure data in molecular modeling software packages.

If you are working in a library with these handbooks or similar reference works in printed or electronic versions, do you offer both opportunities and do you train staff and patrons?

Licensed Information

The new world faces an old dilemma, since you cannot always buy the information. Instead you are "only" entitled to use the product for a certain period of time if you sign a license. This is the case especially with CD-ROMs.

Most of the information is not permanent or constant anymore. Each new database version (on diskette, on CD-ROM or on magnetic tape) may have a somewhat different content. This is, for instance, the case with those CD-ROMs that provide a rolling window to information: always the last 12 months or the last 5 years. Archival and update discs could be linked better.

License agreements, however, are helpful, as you may have experienced by now.

By licensing a CD-ROM you are always guaranteed the most accurate, timely information available - during the licensed period. In addition, you are always guaranteed that you have the latest software. For instance, your search software needs to be upgraded with each version of your system software. There may be error corrections and other improvements as well. Last but not least, if a disc is damaged you may get a free replacement copy under the terms of your license agreement.

The Organization of Information

The American Information Industry Association (AIIA) tries to map the organization of information and they have put together the following segments:

- Content Packages

  Books, Journals, Newsletters, Magazines, Newspapers, Microfiche and -film, Video Tapes and Discs, CD-ROMs, CD-I, WORMs, Tapes, etc.

- Content Services

  Librarians, Information Brokers, Electronic Database Providers, News Services, Financial Data Services, Videotext Services, Voice Services, Electronic Mail Services, etc.

- Information Technology

  Printing and Graphic Equipment, Office Equipment, Business Forms, Microforms, Terminals, Computers, Laser Disc and Optical Media

- Communications Technology

  Mail Equipment, Telephones, Transmission Systems, Fiber Optics, Video Disc and CD-ROM Players, Radios, Televisions

- Communications Channels

  Physical Delivery, Post Office, Telephone, Telegraph, PTTs, Satellite Carriers, Cable, Value Added Carriers, Mobile and Cellular Services, Paging Services

- Broadcast Channels

  Radio Networks, Multipoint Distribution Services, TV Networks, Teletext

- Integrating Technology

  Facsimile, Digital Switches, Modems, Gateways, Packet Switches, Voice Systems

Writing and Publishing

The whole process of recording information is changing. Writing became easier with the help of computers and software. Nowadays, we are writing with computers in mind or even for computers.

Texts (not yet graphics) are being sent from electronic mailbox to electronic mailbox and publishers receive more electronic documents.

The speed of publishing has generally not yet much improved for those publications where peer reviewing, copy editing, integration of text and graphics, professional printing, etc., are required.

We see more publications that are desktop produced. They may be somewhat cheaper and they look it. Sometimes you see books with a whole variety of lay-outs as the different laser-printed texts were simply reproduced.

The publishing work flow, however, is gradually changing, especially in the areas of inhouse publishing, manuals, catalogues, indexes, text databases, etc., and may well be extended to other forms of publications. Especially in the area of technical documentation and information, integrated publishing systems can eliminate various steps as the following two illustrations show (taken from "Text, Context and Hypertext", Edward Barrett, ed., MIT Press).

Traditional (Ill. 1)

XY Vision (Ill. 2)

High Tech - Eye Tech

The science of optics once meant the study of the eye and vision, stemming from the Greek word optikes. Now it means the study of light and all related phenomena including the eye and vision.

An offshoot of optic technology is the laser. The laser has become extremely useful in many aspects of life from surgery, to industrial, to laboratory research, to telecommunications and to the computer field. CD optical storage uses laser technology and a whole family of products and applications is now available or will become available:

CD: CD-ROM
CD-Video
CD-I
CD-XA
CD-TV
Datarom
Orom
Mini-CD-ROM
WORM
DRAW
and other erasable discs

LV: LV-ROM
Medium and large capacity optical discs

Laser Cards
Memory Cards
Softstrip System
Paper ROM

Hi-Vision

Hi-Vision allows for the storage of high-quality images. You can scan images and store them on optical discs, on DAT or on digital videotape. The images, combined with stereo sound, can be shown on screens, broadcasted or printed (video printing).

New, big screens show an increase in the number of TV scanning lines, from the current 525 to 1.125, greatly improving the fine details of the images and enhancing colour reproduction. The aspect ratio (or the width-height ratio of a ratio of a TV screen) is changing from 4:3 to 16:9 like the screens in movie theaters. In the case of Hi-Vision, you can sit closer to your TV-set and still be able to see more than ever. The viewing range is changing from 10° to 30°.

Hi-Vision (as the Japanese call it) provides better opportunities for educational purposes, video conferencing, documentation in the medical field (stills image data bases, for instance, with X-ray films), broadcasting and printing.

Electronic Publishing

There are various meanings for electronic publishing. Some call the whole process of scanning and storing electronic publishing. Other

definitions refer to output facilities for packaging of digitized information such as diskettes, video, interactive video (DVI), CD-ROM, Mailbox, Videotext, combinations of content packages and services as we have seen before.

In the context of this paper I would like to define electronic publishing as the activity to select, combine, present/deliver digitized information from various sources. Publishing for me means "making things public". To me the presentation and delivery/distribution aspects are the most important. Here we see interesting developments like desktop publishing (layout), presentation systems, documentation systems, interactive systems and integrated systems (text, stills, video, sound), and information management systems. New developments are SGML, Hypertext, Multimedia, etc.

SGML is considered to be a tool for managing information for a variety of users.

Hypertext is a higher-level abstraction and navigation instrument in and between documents.

Multimedia are the integrated hardware and software components providing access to a wide variety of types of documents in its own internal format, including text, pixel or vector mode graphic images, and diagrams. In addition, access is provided to external information such as databases, audio and video sequences.

Hypertext

The idea to have all information and documentation instantly available is old. Long before we could even dream of personal computers, Vannevar Bush published his vision of an individual desk-top library, the Memex, a machine that stored microfilm, in the Atlantic Monthly (July 1945). Bush was President Roosevelt's science advisor and users of the Memex would be able to browse through a library containing all kinds of information from literature to photographs.

In the early sixties, Douglas Engelbart at the Stratford Research Institute developed Augment, the first online system with a mouse.

The terms Hypertext and Hypermedia come from Theodor (Ted) Nelson who published an article about associative linking of information with

large networks. (A File Structure for the Complex, the Changing and the Indeterminate, 1965) Hypertext should be something like non-sequential writing.

I would like to quote his first definition:

"Let me introduce the word hypertext to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper. It may contain summaries, or maps of its contents and their interrelations; it may contain annotations, additions and footnotes from scholars who have examined it.

Let me suggest that such an object and system, properly designed and administered, could have great potential for education.

Such a system could grow indefinitely, gradually including more and more of the world's written knowledge."

Nelson continued working on his "world library idea". In 1981 he published the first non-sequential book "Literary Machines" based on an earlier paper with the title "Replacing the printed word". The book has been updated several times. (I have edition 87.1.)

The next step in the history of hypertext was a product called Notecards released in 1984 for Xerox 6805 and 1100 workstations. Notecards link data on-screen simultaneously. A newer generation will be ViewCards.

Peter Brown (Computer Science Department, University of Kent, Canterbury) has been actively working in the hypertext area and he developed the first really successful software package Guide, that runs under MS-DOS, OS/2 and UNIX. Guide is an authoring system with which you can create hypermedia documents integrating text and graphics in a variety of formats. The information is presented as a series of linked "objects" and manages the relationships between them. Every component in such a hypertext document (a single word, phrase, paragraph, graphic) is represented as an object. Guide received the British Computer Society Award in 1988.

In 1987, a new product made hypertext fashionable almost overnight. It was Hypercard, developed in 3 years by Bill Atkinson at Apple. Hypercard links database files from various media and newer versions of Guide and similar hypertext software packages also provide more powerful navigation tools adding the ability to create links to still- and full-motion video and sound presentations.

The link information still has to be provided by the author (or hypermedia editor). This is time-consuming and not so easy for even experienced authors. For this reason, a future integration of hypertext and SGML holds great promise for improved access to and presentation of information.

SGML (Standard Generalized Markup Language)

SGML is a set of rules for document representation developed by the Graphics Communications Association. It can be used for publishing in its broadcast definition, ranging from single medium conventional publishing to multi-media data base publishing.

A document is a structure of various types of element. An author organizes a book into chapters that contain paragraphs and figures. An editor organizes a magazine into articles that contain paragraphs that contain words, etc. Style sheets and manuals are provided by almost all publishing organizations. A lot of coding is done by publishers to ensure uniformity in and between documents. In recent years formatting programs defined the variety of type faces and print types and processing instructions (macro calls or format calls) were stored outside the documents in procedures. SGML is the most enhanced from of generic coding or generalized tagging.

The technical content of ISO 8879 was adopted by the Association of American Publishers (AAP) and an international AAP Electronic Manuscript Project developed the American National Standard for Electronic Manuscript Preparation and Markup (ANSI/NISO Z339.59) in 1988, being the first industry-wide application of SGML.

Standard methods for authors and publishers to keyboard and mark-up manuscripts on a computer are now available and gradually integrated in text processing systems. By following these procedures, any manuscript could be processed on any computer.

Database processing of electronic manuscripts will be especially important to publishers planning to create information products from their primary publications. The traditional activity of publishers, integrating text and pictures on a page, must be enhanced. The growing need to search, retrieve, recompile, and reprocess the information content of books and periodicals requires new procedures for information processing and offers new opportunities for secondary publishing.

CALS (the Computer-aided Acquisition and Logistics Support) is an initiative of the US Department of Defense to accept SGML as a tool in the delivery of digital data. The US Government, the Government Printing Office, CALS and the Graphics Communications Association are now actively exploring the advantages of SGML as a tool for managing information for a variety of ultimate users. Several conferences in 1991 announce examinations of SGML in hypermedia applications. Contractors and suppliers of the US Government are gradually requested to apply SGML.

In Europe, several publishers, typesetters, printers, database producers and software houses are actively discussing their opportunities in an SGML working group. Aims are to develop document type definitions for journal headers and, in a second phase, for whole documents. For further information, I would like to recommend to write to Mr. Holger Wendt at Springer-Verlag in Heidelberg (Tiergartenstrasse 17, W-6900 Heidelberg, FRG).

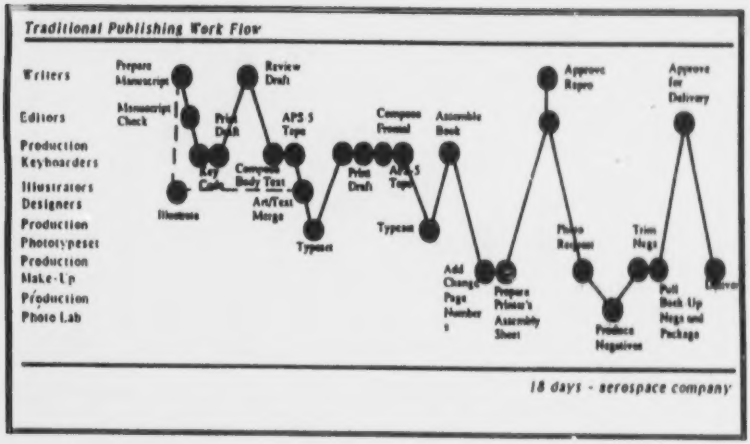
Multi-Media becomes Hypermedia

With developments like Hypertext and SGML and the accompanying hard- and software, the world of hypermedia is not far away anymore. There are many prototypes being shown already that retrieve information from a variety of different sources, stored on different media, and present all this information as one database: text, graphics, digital images, audio and interactive video. A very interesting development is Hyperdoc, that received an Oscar of Innovation in 1988. Hyperdoc is a multimedia interactive information access system and is implemented a.o. by ESRIN (CUIS, the Columbus Utilisation Informational System for the launch of Columbus), CES (Cooperative Extension System between 3000 CES offices in the USA and the US Department of Agriculture).

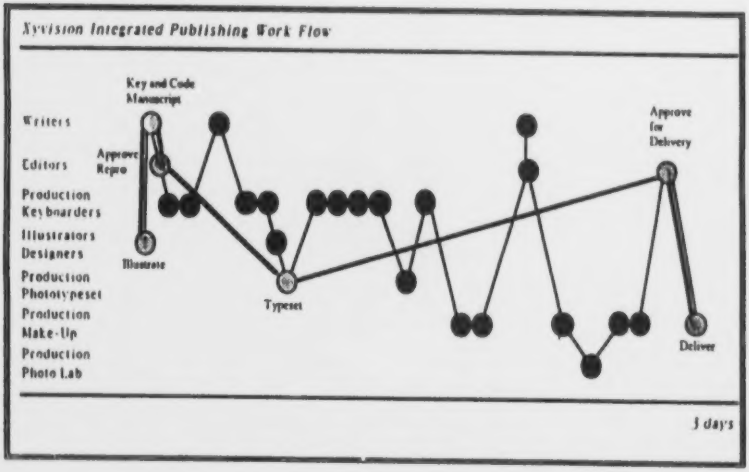
Other developments are with research organisations and large university networks. They may well be the topic of a future Essen Symposium.

A list of books and journal articles on hypertext will be sent on request.

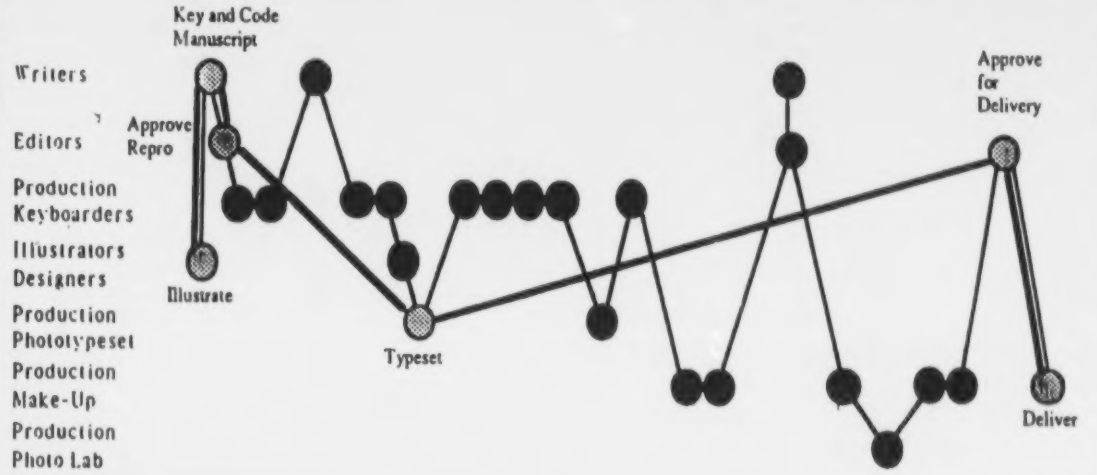
Traditional (Ill. 1)



XY Vision (Ill. 2)



Xyvision Integrated Publishing Work Flow



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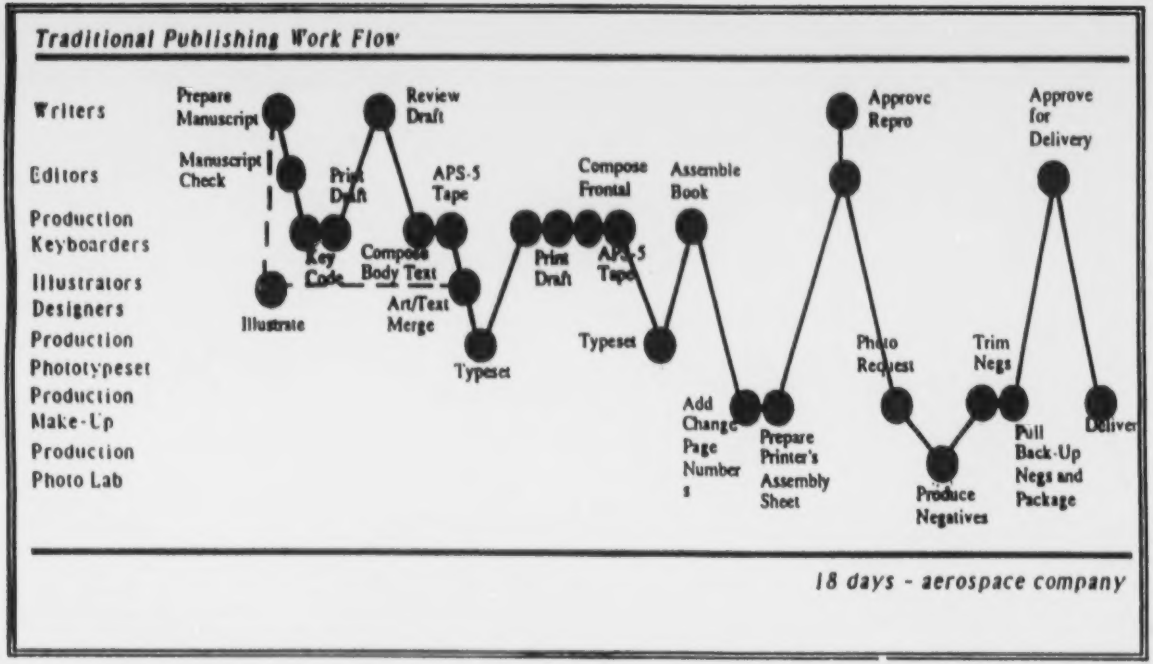
Traditional Publishing Work Flow
Writers
Editors
Production Keyboarders
Illustrators Designers
Production Phototypeset
Production Make-Up
Production Photo Lab
Prepare Manuscript
Manuscript Check
Review Draft
Print Draft
APS-5 Tape
Key Code
Compose Body Text
Art/Text Merge
Illustrate
Typeset
Print Draft
Compose Frontal
APS-5 Tape
Typeset
Assemble Book
Add Change Page Numbers
Prepare Printer's Assembly Sheet
Approve Repro
Photo Request
Produce Negatives
Trim Negs
Approve for Delivery
Pull Back-Up Negs and Package
Deliver
18 days - aerospace company

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"Free" or "Fee" Information Resources in Libraries - The Case of Small and/or Developing Countries

Shmuel Sever

University Library of Haifa
Israel

"FREE" or "FEE" Information Resources in Libraries - the Case of Small and / or Developing Countries

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Abstract

Information databases are developed mostly in the large countries. The smaller ones, especially the developing countries, have problems to access. The CD-ROM techniques may help to reduce the costs, but not to clear the question of "free or fee".
A US-American discussion of the pros and cons will show the complexity of the topic. Special conditions have to be considered in smaller and developing countries. As a result of the paper, the author makes the proposal that the have-not countries should get help to create local electronic databases and information professionals as well as core information on CD-ROM databases supported by the UN. "Information seeking is a major tool in creating the infrastructure of a modern society and this cannot begin at the graduate level, if creativity and equal opportunity are to be developed." / Sever.

"Free" or "Fee" Information Resources in Libraries - The Case of Small and/or Developing Countries

The idea of "free" as opposed to "fee" information resources is only partially correct: there is always a price for information; in any form it costs money. The question is who pays for it - the public (by means of taxes) or the user. Thus the question should be rephrased to "free" or "for a fee paid directly by the user."

Information is already not only dependent on price and availability, but also on the social and political significance that a society attaches to the availability of information. In different societies and ideological frameworks the answer would differ as to whose information should be tax supported and who would have to pay for it. The attitude of different societies to payment for information is difficult to assess. The great majority of information on the subject being of American origin, it approaches the problem mainly from the liberal, democratic ideology of American society - with its particular subjects and shades - and which are not always relevant in the context of other societies.

In the US, the role of the public libraries was mainly perceived as being that of providing information, education and knowledge to an informed citizenry, that being one of the basic tenets of a democratic society.

The information itself was seen originally as mostly printed and only later it was redefined as recorded knowledge in all its forms. However, the diffusion of information included not only mass media in their various forms, but also human communication channels as well: not always recorded knowledge, but rather information shared through invisible informal communications during congresses and symposia. This was always perceived as communication of knowledge by an elite, entailing institutional costs such as the price of attending congresses or dispersing information through correspondence and private sharing of research results.

In western society the printed word was usually thought to be available as free of charge to the user, when paid for by taxes or institutions, but there were exceptions to this, and literature searches performed for the

academic user were often paid for. Later the payment was expected for audio and visual media even though these were perceived as entertainment, rather than information.

The question of the fee for information became more acute with the advent of electronic information - an expensive service in an era of decreasing library resources. The price for that type of information could only be higher than the price of printed information, since electronic information demands more professional skills of the librarians while consuming more of their time, and tele-communications are inherently expensive. Connect time price increased as users became more sophisticated and expected more extensive, thus longer searches. (Of course, on-line catalogues of local institutions were not part of the main problems regarding electronic information, as these were often thought to be the prerogative of academic personnel.)

The introduction of CD/ROM is likely to change the situation in many respects; they set aside the need for tele-communications, and permit their use on a local level with all the benefits of on-line information retrieval on the one hand, while preserving the ability for a book-like use, on the other.

However, high costs of large data bases, not supported by the US government, and even more the practice of leasing, which does not assure continuity, present a new set of problems in the use of CD-ROM. Internal institutional networking of CD-ROM is not only expensive and somewhat problematic, but also often not cost efficient, because of the increased price of leasing which depends on the number of work stations.

Still the increasing use of CD-ROM and its entrancing possibilities, both as an information tool and as a quick reference tool replacing thesauri and encyclopedias, warrants special attention in dealing with the use of information in publicly supported libraries, where not only efficiency, but also the social and political access to knowledge of an informed citizenry is paramount.

It is the CD-ROM, however, which brings a glimmer of hope to developing societies, where the possibility of avoiding the complex problems of expensive telecommunications and international subsidies may develop local information professionals, and local access to information.

The problem of fees became progressively more acute beginning in the early seventies, when most libraries charged for electronic information.

There were two main rationales for this: one, that the library "added value" to the information by processing it and thus saving the customers' time; the second, that the services were so expensive, that libraries could not offer them without a fee.

In both cases the assumption was that the reader had access to the printed information anyhow, thus he should pay for the time saved or for the "added value".

This assumption had special importance in public and academic libraries - where the reader could supposedly get the information without access to the electronic data bases, provided he invested more of his time and was ready to accept a less complete search than was possible electronically.

The first to approach formally the problem of charging fees was the Americal Library Association (ALA) which stated in its ALA Policy Manual, Positions and Public Policy Statements, paragraph 50.4, that charging of fees and levies for information services, including those services utilizing the latest information technology, was discriminatory in publicly supported institutions providing library and information service.

By 1981 ALA had published a thorough survey by Mary Jo Lynch - which stated that most publicly-supported libraries charged fees for electronic information - 72% of public libraries, 86% of academic libraries. (Lynch)

The question of charging fees was important mainly in the US public and academic libraries; its relevance, if at all, was minor in special libraries, which are mostly science libraries. The National Commission on Libraries and Information Science (NCLIS) devoted much attention to the problem since its inception in the early 1970's.

The anti-fee and pro-fee arguments were identified as follows:

Anti-Fee Arguments

1. Library services are a public good. Free access is a fundamental right of each citizen in a democratic society.
2. The American tradition of free library services is damaged by charging fees. The introduction of fees is the beginning of the end of free library sevices.
3. Fees are illegal. (Some state legislation supporting library service is ambiguous and has been interpreted to exclude fees.)

4. Fees are discriminatory. Only those who can afford to pay may use special services. Fees negate equal access to information. They discriminate against those users who either lack the resources to pay for services, or are unwilling to pay for services. An individual's access to information will be based on ability to pay rather than need.
5. Fees represent a form of double taxation. Users are charged first by taxes to operate public services and then by charges for special services.
6. Libraries will place emphasis on revenue generating services. Libraries will shift from non-revenue producing services to those which generate revenue, even if the non-revenue services are vital to a part of society which cannot afford the fee.
7. Fees will have the long-term effect of reducing public support for libraries.
8. Fees might not be used to support library services. Revenues received from fees may be returned to the general revenue fund and allocated for nonlibrary uses. No one has shown that revenue has actually increased after imposition of fees, when all costs are taken into account.
9. The social benefits of library services are difficult to measure, therefore a fee cannot be efficiently assigned. Fees charged have been set by analysis of market demands or costs.
10. It is difficult to define special services and basic services and to distinguish between them. Should citizens be expected to pay extra for better fire department equipment, or additional policy security assistance? Services once viewed as special are now viewed as basic.
11. Private and public sector markets are separate. The private sector should charge fees, reap profits, and compete in whatever manner is appropriate. Publicly funded libraries should provide services out of their budgets and should not provide services for a fee.
12. The cost of administering and collecting fees outweighs the financial benefits of fees.
13. Most users have little need for fee-based online services. Users don't need a speedy response, they simply want an answer. Fee-based

online services are really a convenience for the librarian, not the user.

14. If the service cannot be provided without a fee, the service should not be provided.
15. Improvements within library management and delivery of services would diminish the need for fees.
17. Charging for a service subjects libraries to liability risks because of the responsibilities implicit in providing a service for a fee.

Pro-Fee Arguments

1. Charging fees increases recognition of the value and importance of the value and importance of library services.
2. Fees encourage efficient use of public resources. Those who benefit from a given service should pay for its associated costs. An efficient pricing system allows the consumer the flexibility to choose from a variety of public goods and services and pay an amount that is in proportion to the amount consumed.
3. Fees promote service levels based on need and demand. The willingness of the public to pay for a service is a good indication of the public's demand for the service. However, willingness to pay is not the only indicator. By pricing public goods and services, local government is demonstrating the need to diversify its revenue base, and provide those services supported by the community.
4. Fees encourage management improvements. Examples of such improvements include increased productivity, better time management, better organization and control, and the establishment of a management plan based on staffing, equipment, and available resources. Accurate financial control is an ongoing responsibility for the departments that administer fee based facilities.
5. Fees limit waste and overconsumption. Setting a fee can lessen inefficient or wasted use of public facilities. Fees have a rationing effect on user consumption. Indeed, a pricing plan may be structured to limit "peakload" situations or encourage use in off hours.
6. Fees enhance investment in ongoing maintenance and repair of public facilities. Fees improve the level of facility maintenance in providing revenue dedicated to maintaining the service.

7. Fees encourage a better understanding of the financial limitations of the local government. Pricing public facilities indicates that there are financial limits to what government can provide.
8. Premium service should be provided only to those willing to pay a premium. Users should be given the choice of having these services. These are services not traditionally provided by the library.
9. The tradition of charging for services is part of American culture. Users pay fees for other public resources and services such as bridges, highways, museums, and parks.
10. Fees control growth of and lower demand for service. If service demand is greater than capacity to meet that demand, fees help to discourage "frivolous" use of services.
11. Escalating service costs make user fees a necessity. Information has economic value. "Free" access to information is not the same as "without charge." Adopting a no-fee policy forces substantial limits to service. "Free" services are unrealistic in times of tight budgets.
12. Most library users can afford to pay a fee. The public library serves a relatively young, educated, middle-income segment of the population. Low-income persons make limited use of the library. A fee-based library would relieve the poor of the tax burden associated with the free library.
13. Without fees, public and academic libraries could not serve the larger community or nonresidents. Fees for nonresidents are equitable since this group does not pay the taxes levied on residents. Fees for nonstudents are equitable because this group pays no tuition.
14. Fees cover only a small portion of the total cost of service provision.
15. Fees for most services are simple and inexpensive to collect.
16. Local policy may require libraries to charge for services. (Eaton)

The National Commission on Libraries and Information Science (NCLIS), through its Task Force on Library and Information Services to Cultural Minorities, approached the heart of the issue of the inequity in a democratic society stemming from the charging of fees:

"Recommendation # 5: Benefits of the new technologies in libraries must be distributed equitably among patrons from all walks of life and all strata of society.

Recommendation # 25: Urge libraries to remove the various barriers to information and services which exist. Funds should be made available to prevent barriers which are the result of insufficient numbers of staff, cost of automated services which cultural minorities are unable to absorb, and denial of access to information in the native tongue of some cultural minorities.

Recommendation # 37: Tax supported libraries should avoid charging fees which might create barriers to minorities and minority communities."

During the discussion of these recommendations, members of the Commission raised several questions concerning the extent to which fees are charged, the percentage of libraries charging for any services, and the services for which fees are charged. Since the information to answer these questions was not readily available, the Commission decided that an overview study was needed to gather existing information and to indicate what data are missing. The Council on Library Resources generously provided funds for this study. An outside expert was chosen to write the paper and a distinguished Review Panel was selected to oversee its preparation. The Panel had no official government advisory role. The list of panel members reflects a wide range of expertise, perspectives, and interests. The Review Panel met on October 19, 1984, and February 6, 1985. The first meeting focused on defining the structure and content of the paper, the second, on reviewing and revising the draft. A final draft was presented to the Commission in April, 1985.

The major findings of this study are:

1. An objective statement of the complex issues related to the charging of fees in public and academic libraries.
2. An objective statement of the pro-fee and anti-fee arguments.
3. A confirmation of the hypothesis that there is little data available about who is charging fees, the services for which fees are charged, and even less about the effects of fees on access to information.

The major recommendations of this study are that:

1. The library and information community use this study as a springboard for discussion of fees with the goals of clarifying the issues and making sound policy decisions.
2. More data be gathered on who is charging fees and for what services.

3. Additional studies be undertaken to determine the effects of fees on: a)access to information by users, in particular those least able to pay, b)user behavior, and c)library service.

The problems encountered by the services to cultural minorities can be extended and amplified to help us understand the situation in developing countries. The problems in these societies are graver and more complex. Not only economic resources are lacking for the development of local systems and use of international ones, but also local professional information specialists, who are capable of translating and interpreting information according to the cultural and psychological needs of the local elites may not be available. Creative understanding is not an objective international factor, it depends on the cultural perception of each group. This explains the inadequacy of international information services to serve developing societies, if there are no local professionals to adapt the information available.

Information price

The literature on the "fee" or "free" information is rather scarce for countries other than the US; it simply does not exist with regard to my country - Israel.

One possibility is that the European approach is less reluctant to charge fees and less committed to the concept of free access to information than that of US. Fees in public libraries, even for regular services are more "accepted" in Europe than in the US. In this repect Israel is conceptually nearer Europe than the US, and has yielded to the demands of economic pressures and urgent needs for information mostly available only overseas.

Attempts to produce local electronic information (batch) include the activities of Dr. Uri Bloch at a defense establishment, and the Library of the University of Haifa's producing the Index to Hebrew Periodicals and automating several other databases produced by other institutions.

The online use of these databases began in the 1980's at the University of Haifa. Later, in the Aleph version, they were made available at other Israeli universities, but not to public, special or school libraries. For the elite, the problem was therefore not very grave, especially since university libraries in Israel are looked upon by the intellectual elite as having public library roles to fulfill in addition to their traditional functions of

teaching and research. At the University of Haifa these on-line services were and still are free - but charging fees is being considered.

The possibility of producing CD-ROM for all or some of the local data bases is also envisaged.

Foreign electronic information was always subject to cost. The first attempt was made during the early 1970's by the library of the "Technion School of Medicine" for MEDLINE through the European Koeln center. The National Center for Scientific and Technological Information has been trying to provide electronic information to industry and business, with limited success. International information resources are available in all universities and several large special libraries, but this is always a fee service. Thus, while the information is available, it is more accessible to the well established scientists and researchers, less for the younger ones who have fewer or no research grants and even less to graduate students. They are practically unavailable to undergraduate students. On line electronic information is not available in public libraries and school libraries. The availability of electronic information to an elite only poses a question as to the future of Israel as a creative developed society - at least in the opinion of this author. Information seeking is a major tool in creating the infrastructure of a modern society and this cannot begin at the graduate level, if creativity and equal opportunity are to be developed.

Some change wrought by the availability of on-line information can be seen in the last two years, since the introduction of the CD-ROM in university libraries.
These are available in all Israeli universities, to all users, but for a fee - however modest (it varies from IS40 to IS60 per hour of use). The only exception is the library of the University of Haifa where, for the academic year 1990/91, use will be free - while a fee is planned for 1991/92, after the patterns of use are learned.

The use of CD-ROM does enlarge the potential group of users to include undergraduate students - but it still only deals with an elite. Information from foreign sources is often less important to the Israeli high school and undergraduate student than electronic information available locally, in the local language. Israelis are reasonably computer literate and only when local electronic information is not sufficient the use of international data bases is second best.

"A major concern for scientists is the continuation of the subsidized browsing capacity in the electronic environment. The control of databases and networks by the for-profit sector has created a set of costs imposed directly on the information seeker. There is already evidence that this constraint influences the path of intellectual inquiry, the choice of research topics for the graduate student, and alarming variations in the level of potential productivity among the information haves and have-nots. Information costs have now become a visible influence in determining the thoroughness of a literature search by graduate students, a factor which erodes the overall quality of the research effort."

Information upon which knowledge and creativity are based are now widely available in the US, at least for those who can afford it. Patricia Battin's statement in front of the US Congress is even more true for developing have-not countries than for developed ones. People who need the information most do not have access to it - and if they do, it is by the intermediary of an elite, divorced from the mainstream of the society, serving mostly non-democratic societies and goals. The way to amend this phenomenon (to some extent) is by helping create local electronic data bases, local information professionals and access to a core information CD-ROM data base supported by the UN along the lines suggested at the Essen Symposium two years ago by Abdul Aziz Abid and by myself.

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Providing Scholars with Information from Electronic Books

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Providing Scholars with Information from Electronic Books

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Abstract

The research program described in this presentation is designed to answer the question, "What is the specific information that people obtain from library materials for their own use?" It is necessary to have at least a partial, if not complete, answer to this question to design an online system for retrieving information from machine readable texts. Clearly, a single investigation cannot answer this question; rather, the program must be constructed of a series of research projects. The first question to which an answer is being sought is, "What are the characteristics of the information that scholars obtain from books to write their research monographs?" One somewhat surprising initial finding is that two-third of citations in scholarly books to other books are to information on a single page.

Scholarly Use of Information in Books
A Preliminary Report

This presentation is a preliminary report of an analysis of information that scholars obtain from books to write scholarly monographs. The research program, entitled Referenced Information Analysis (RIA), is being undertaken to provide data to be used in design of an electronic library system. A series of research projects will analyze references in scholarly books to other books, journal articles and collections of scholarly papers that appear in festschriften, proceedings of congresses, and the like; the annual **Publications of the Essen University Library**, in which this paper appears, is an example of the latter. Subsequently, references in journal articles and collections will also be analyzed.

The first project seeks an answer to the question "What are the characteristics of the information in books that scholars use to produce new knowledge in scholarly monographs?" No similar inquiry exists, although studies have appeared that relate to non-fiction books and journals that people use or read. These published studies fall into two groups, the first of which employs questionnaires to elicit opinions as to the type of materials people use and the frequency with which they believe they use them. The second group of published studies acquires information in actual use of specific items by interviews with users. Recent examples of these two types of investigation carried out at OCLC are "Initial Report: Results of a National Survey on the Use of Books and Journals" by Martha J. Lindeman and her colleagues (1), and "Assumptions About Information-Seeking Behavior in Nonfiction Books: Their Importance to Full Text Systems" by Chandra Prabha and Duane Rice (2).

Materials and Methods

Three criteria are used for selecting books to be analyzed. First, the original publication date must be within the last two decades, to insure that only current scholarly practices are being analyzed. Second, the references must contain specific page numbers on which the referenced information is located. Such references as "passim," "chapter," and "see also" are disregarded. Third, there must be minimal "n ff" references ("p. 8ff" is an example), the use of which style manuals rightly discourage.

One title, **The Coming of the Book** by Lucien Febvre and Henri Jean Martin, was withdrawn from the study because 44.8 percent of references were of the "**n** ff" variety. As references to two pages were only 2.5 percent, a much lower figure than those shown in Table 1, presumably many actual two-page references were concealed in the "**n** ff" imprecision. The Braudel work in Table 1 has an uncomfortably high 6 percent of "**n** ff" references, but since its 14.0 percent of two-page references is reasonably close to the average, Braudel's use of "ff" apparently does not bias the two-page findings.

Three photocopies were made of the group of notes at the back of each book -- one master and two working copies. Each reference to a numbered page or pages in another book was signaled and the the sum of the references recorded. Each single- and double-page reference was identified, and the total number of each was recorded.

Results

Table I contains the frequency distribution to one- and two-numbered book pages in monographs having more than 1,000 references to other books. The percentage of single-page references varies from 40.2 to 89.3, while two-page references vary from 9.8 to 22.2. Curiously enough, the book with the lowest percentage of one-page references has the highest percentage of two-page references, while the book with the highest percentage of one-page references has the lowest percentage of two-page references. One-page and two-page references comprise four-fifths of the 5,516 references to other books in these 4 books .

An analysis of 19 two-page references, all of which were available in a fifth book not included in the table, revealed that 13 of those 19 or 68.4 percent actually occupied less than one textual page. Multiplying the number of two-page references in Table I, 903, by .684, yields 617.6 or 618 pages, which when added to the number of single-page references yields a total of 4,147. Dividing this last figure by the total number of references yields 77 percent. In other words, it appears that the total of references that occupy one textual page or less is probably about three-quarters of the total book references.

Discussion

It has long been recognized that subject headings assigned to entries in library catalogs are ineffective providers of access to information in

books. At best, they are merely pointers to a source in which a seeker of information may find what he is looking for. In 1979, Edward T. O'Neill and Rao Aluri published a study of subject heading patterns. They found that the Library of Congress (LC) assigned only 1.58 subject headings per monographic book, of which only 1.156 or 73.2 percent were topical headings (3). Moreover, these topical headings were assigned to only 71.3 percent of LC records included in the study (4); the other 28.7 percent receive form headings, of which "Addresses, Essays, and Lectures" is the most popular. More recently, F.W. Lancaster has reached the preliminary conclusion "that conventional approaches to subject access in large online catalogs are very unsatisfactory, and most unconventional approaches suggested in the past offer little hope for improvement" (5). Another examination of the 19 two-page references mentioned above revealed that 47.4 percent of the referenced information was not in the back-of-the-book index. Clearly, some new technique must be developed to facilitate retrieval of needed information from texts. One possible solution would be to develop an indexing technique that would add the 47.4 missing entries to the back-of-the-book index and to construct a "full-text" search of the index alone.

Conclusion

A preliminary answer to the question "What is the information in books that scholars use to build new knowledge?" is that three-quarters of such information occupies a single text-page or less. A preliminary finding that back-of-the-book indexes list only half of these small dollops of information suggest that an improved computerized index would greatly facilitate access to information sought in books.

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Table 1: Frequency of References to One and Two Pages in Four Books Having More Than 1,000 References to Other Books

Author	Total Page References	1 page Number	1 page Percent	2 pages Number	2 pages Percent
Braudel*	1,339	996	74.4	188	14.0
Chandler**	1,410	567	40.2	313	22.2
Graff***	1,466	920	62.8	275	18.8
Merkle****	1,301	1,162	89.3	127	9.8
Totals and Averages	5,516	3,645	66.1	903	16.4

* Fernand Braudel, The Structures of Everyday Life, New York: Harper & Row, 1979.

** Alfred D. Chandler, The Visible Hand, Cambridge, MA: Harvard University Press, 1977.

*** Harvey J. Graff, The Legacies of Literacy, Bloomington, IN: Indiana University Press, 1987.

**** John C. Merkle, The Genesis of Faith, New York: Macmillan, 1985.

Minimal Micro Management: Multi-Tasking and CD-ROM Applications

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Minimal MicRo Management: Multi-tasking and CD-ROM Applications

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Abstract

Almost all the microcomputers in use in the library sector at Oxford are MS-DOS based. With falling hardware prices, it has become usual over the last year or two for 80286 and 80386SX machines with fast hard discs to be purchased to serve as 'standard' PCs where previously 8088 and 8086 machines would have had to suffice. The superior performance they offer has enabled us to set up a variety of multi-tasking applications, some incorporating CD-ROMs, which will be examined in this paper.

Minimal Micro Management: Multi-Tasking and CD-ROM Applications

0. Preamble

I should like to add my voice to those who have expressed their appreciation of how well this Symposium has been organized. Also, to thank Dr. Helal and all who have made this event possible for their truly marvelous generosity and hospitality. Having said that, I trust that Dr. Helal will permit me to make an almost insignificant change to the title of this paper, which should now read "Minimal Micro Management"[1]. This is to reflect a principle which guides us when we configure the productions PCs destined to stand alone: that they should be maximally usable but require the minimum of attention on the part of the computer section, most particularly me.

Managing micros might seem a rather specialized branch of library management, but the PC is now a fundamental tool of Information Technology and I hope it will be of concern to management to hear how, with relatively little investment of all too scarce computer expertise, multi-tasking methods can improve certain library processes. This can lead to savings by increasing productivity, but we also have observed qualitative changes: greater accuracy and interest - even excitement - on the part of staff whose routine tasks have been streamlined and who have enjoyed using a computer in what they perceive as an advanced way. One note of warning: though I have said that little investment of computer expertise is necessary, that is not to say none!

1. Introduction

Oxford University has embarked on a project that should eventually bring most of the University's hundred or so libraries on to a single, DOBIS/LIBIS integrated library system. Called Olis, this network of libraries, currently numbering 35, of which the Radcliffe Science Library is one, shares a catalogue, but each library has files for local information. To date, the cataloguing and circulation modules have been implemented; the acquisitions module is in the process of being implemented; and a pilot implementation of the periodicals control module will start in 1991.

Microcomputers have become an integral part of the cataloguing process and are used extensively for many other purposes. In the library sector they are almost exclusively IBM compatibles running MS-DOS and, given the need to share software, this is likely to be the case for years to come. With this in mind, we decided to investigate how we could exploit the power of hardware based on 80286 and 80386SX chips, now increasingly affordable, even with our modest budgets.

Most programs benefit immediately from faster CPUs and hard-discs so much so that we now rarely consider purchasing 8086 based machines. Modern machines are usually delivered with 1Mb of RAM - the clones we currently favour come with 2Mb as standard. Few programs in general use take advantage of this extended memory: some wordprocessing software can, but the effects are hardly noticeable compared to those due simply to running on a faster machine.

Our interest has lain in using this additional memory in conjunction with the 80386's virtual 8086 mode to run multi-tasking applications. On the premise that computers do not mind how hard they work, we wanted to harness the full resources of the machine and to make it earn its keep.

It should be made clear that multi-tasking entails running two or more applications simultaneously and sharing CPU time between those required to stay active. In 1989, there was little MS-DOS software on the market which could support genuine multi-tasking. Though most shell and windowing software available at that time did provide an interface between applications allowing interchange of data via 'clipboards' etc., they simply suspended tasks that were put aside, allowing one to run in the foreground. Quarterdeck's DESQview 386 seemed to promise more, and this paper reports our early findings.

The next section will discuss our preliminary evaluation which led to the introduction of DESQview 386 into the production situation. Then we will look briefly at some case studies in order to illustrate how and why we have employed it.

2. Preliminary examination of DESQview 386

Installation on the machines we have been using, 80386SX based with VGA graphics and 1 or 2Mb RAM, has been straightforward. The latest version (2.26/5.0) has more features, including a program called OPTIMIZE which, when run after installation, has successfully rearranged the software configuration to make better usage of memory, for example, by

loading parts of DOS into extended memory, thereby providing a larger maximum executable program size. Another new program, VIDRAM, will, at the expense of removing graphics video modes, extend the DOS partition to up to 736Kb. This feature can be switched on and off by running the program so it is simple to restore full graphics capabilities between applications.

Having installed DESQview, it must be configured for the applications to be available to the user. It will automatically add many of the better known packages, such as WordPerfect, to its menu quite adequately, but setting up applications for which it has no program information does require expertise and can be time-consuming: often, a good configuration can only be achieved laboriously by trial and error. It soon became clear that installation should not be the end-users responsibility in our library.

Apart from machines used by a single person, such as a developer, we did not choose to use DESQview as a complete working environment, 'desktop', or 'front-end', from which different applications could be 'launched', which is presumably how the manufacturers conceived it. In the first place, the program is sophisticated and it is susceptible to complex fine-tuning from within itself. Unfortunately, the options which take you into the technical recesses of the program cannot be removed, and it is all to easy for the uninitiated to lose themselves or even to damage the system through an inadvertent mouse-click. Secondly, there is conflict with the loaded software when it is wished both to use *Olis* and display diacritics: it redefines display of the higher ASCII characters, including importantly the characters used by much modern software to draw boxes and panels. Thirdly, there is nothing to prevent DESQview from attempting to open an application more than once. Finally, though all our staff use computers and we have specialists on-site to provide support, there are still many who could not manage a multi-tasking environment.

Most of our machines are for general library use. The applications loaded on each are appropriate to its location and all members of staff, and readers on machines provided for them, are free to run those listed, though password protection can be placed on write access to databases. We have developed a simple menu system for our production machines from which applications can be run. It includes the ability to 'Quit to DOS', so those who know DOS can use it[2], so reducing demands on

the computing section to perform basic tasks such as formatting discs or copying files. This arrangement has worked well and we could only see problems in replacing it with DESQview. Instead, our approach has been to seek areas of work which could benefit from the power afforded by DESQview to multi-task applications. In each case, we tailored DESQview for the job, and made of multiple tasks a composite application which could be run from the normal menu by specific individuals who had been trained in its use. The single problem we have encountered so far is that we cannot use screen-savers on these machines as they conflict with DESQview, causing it to hang unpredictably. DESQview's own screen-saver only works when DESQview is running[3].

Applications run in DESQview windows can be given the full screen or a portion of it for display. Unlike graphics-based applications, text-based, which account for almost all library software, cannot be 'scaled down' to fit in less than full-screen windows, so only a portion of the usual screen can be seen. This can be extremely confusing, and so we set up all applications to display the full screen as the default. This has a further advantage: when there is only one application visible, the users can be certain which they are addressing. The judicious use of colour can help users keep track of where they are in the system.

From our point of view, the important aspects of multi-tasking have been:

i) The ability to have several applications open simultaneously and to switch easily and instantly between them;

ii) The fact that tasks 'in background' continue to despatch. This is important for communications programs which should always remain active to handle i/o, so long processes like report generation can run without tying up a machine, and also so the user can switch to another application while waiting for an interactive operation, e.g. a CD-ROM search, to complete;

iii) Easy transfer of data between applications;

iv) DESQview has a macro-creating system which is relatively easy to learn and which can be used in applications with crude or no macro writing facilities. This tool has proved to be effective for cut and pasting blocks of text between sessions *if* the operations are predictable, when it makes a mouse seem positively elephantine.

These four features will be illustrated in the next section when we examine the multi-tasking currently in operation.

3. Current Multi-tasking Applications

a. Reference Librarianship/Book Selection

An Assistant Librarian charged with book selection maintains a database of potential requirements, which is used to generate orders. He needs to consult it, as well as several local databases (recent accessions, open-shelf books and serials) and the *Olis* online catalogue[4] when dealing with readers' bibliographic enquiries. With DESQview, he currently opens up to six windows simultaneously, one of them being Kermit, a terminal emulator, which allows him to connect to *Olis* or to one of the other 55 OPACs available over the U.K.'s Joint Academic Network, JANET.

This is a straightforward implementation of DESQview. That he is able to run so many databases simultaneously with only 2Mb of memory is due to the compactness of the database manager in use, Psion's now obsolete *Archive*, which needs only 180Kb to run. When there is insufficient memory available to start a new task, other tasks are paged to disc, with a pause of some seconds, and cease to be active. It should be noted that some programs would need to be network versions in order to be used safely, or indeed at all, in multiple sessions.

b. Multiple sessions on remote hosts

A datapoint on the Oxford University Data Network can be configured for 'expert users' to allow up to five concurrent online sessions. Switching between them is clumsy and requires some skill; typically the sequence of key strokes is something like <Alt-B> ... r,1 <Enter> ... <Ctrl-G> with pauses between. A far better arrangement, which requires two datapoints, two modems and two serial ports, has been to have two DESQview windows, each running a terminal emulation program, which can easily be switched between with one or two simple key strokes. This is one instance of where using colour to distinguish sections has been essential.

i. Cataloguing

The normal cataloguing procedure is to search successively *Olis*, the CURL database and then OCLC for batches of books for which bibliographic records are required[5]. The process may be repeated two more times at set intervals for a book before resorting to original

cataloguing. We intend to use multiple remote sessions when copy cataloguing, analogous to the use of EBSCO's *The Serials Directory* (see below), so reducing the number of times a book is picked up, examined, and put down, and thereby streamlining the cataloguing process. At the present time, the Bodleian library is about to use the technique for catalogue maintenance, specifically to compare duplicate records in order to decide which one should be kept.

ii. The VAX-Olis Gateway

A network link has not yet been established between the *Olis* email system and the outside world. Until it has, we shall continue to use DESQview macros to cut and paste messages between sessions on the University's mainframe and *Olis*.

c. Preparation of Documentation

It is all too frequently necessary to produce in-house documentation. DESQview has provided the ability to take screens from the applications one is describing and paste them directly into the document with few formatting problems. Amusingly, in writing this paper I discovered that one program it fails to cope with in this respect is itself! It does not allow 'marking' its own menu screens for copying. Recently, its cut and pasting facility provided a quick and simple way of rescuing a document corrupted by an early release of WordPerfect 5.1, which could not be printed or the text 'exported' in WordPerfect 5.0 or DOS text file format, though it could be viewed on the screen.

d. Background processing

Two developers in the computer section have benefited from using DESQview to run long processes such as print/report generation programs, long file transfer and database maintenance in the background. This allows them to continue using their machine for program development, for example. It is indeed fortunate that a program crash will not usually hang the whole machine. A soft reset, e.g. < Ctrl > < Alt > < Del >, or DESQview itself, will normally clear the current window without impacting the others. To reset the whole machine DESQview 386 uses < Ctrl > < Alt > < Ins >.

e. Shelfmark generation

Some years ago, we automated the manuscript hand-lists we had used for keeping stock of our open-shelf material (c. 20,000 books and 4,000 serials). We shall continue to use them at least until such time as we have completed retrospective conversion of this material on to *Olis*. Even then, it is likely that we shall carry on maintaining them, firstly, because they enable us to direct readers at least to our open-shelf material during 'down-time' (we have no backup system for *Olis*) and secondly, because it provides facilities which *Olis* is never likely to, especially generating shelfmarks (call numbers) for material introduced into our reading rooms.

Minimal bibliographic details are entered for each new item (author, title, edition, year). Having specified a general subject area and classification, the operator is supplied by the program with the next avaiiable shelfmark in that sequence. With hundreds of different shelfmark schemes within the University, many of which use running numbers, it is not surprising that we have no plans for developing *Olis* to generate shelfmarks in such a manner for all the constituent libraries!

When a book is acquired by a reading room, the copy information, most important of which is the shelfmark, must be attached to the bibliographic record on *Olis*. Having the local database and an *Olis* session open together was an obvious application for DESQview, it has enabled us to transfer shelfmarks generated locally to the *Olis* record with a single keystroke, which saves time and avoids the pitfalls of transcription. The latter matters greatly because *Olis* keeps shelfmarks (call numbers) in single alphanumeric field, so if a shelfmark includes numbers, they must be formatted carefully to stay in sequence. Rules govern how spaces should be embedded in shelfmarks in order to achieve this. Operators uniformly find it hard to adhere to them, but a DESQview macro can pick up perfect shelfmarks from the local database and transfer them to *Olis*[6].

When this multi-tasking application is selected from the reading room's usual front-end menu, DESQview is set up to run a macro to open the two local databases (serials and books) and automatically dial through to the *Olis* logon screen.

f. Cataloguing with CD-ROM

We have set up two multi-tasking applications using CD-ROM. A common aim for both was to reduce waiting for CD search results. In the case of the Library of Congress Subject Headings CD-ROM, *CDMARC Subjects*, the application was founded on the ability to multi-task, whereas copy cataloguing using EBSCO's *The Serials Directory* was an established application which we felt would be improved by running a concurrent *Olis* session. DESQview also provided the only means by which we could run the EBSCO search software under DOS 4.01.

i. Subject cataloguing with CDMARC Subjects

The 'subjects' file on *Olis* is an LCSH authority file. The entries are not pre-loaded but are from the bibliographic records on the system. Subject cataloguers are responsible for entering new headings which they have transcribed from LCSH on microfiche. Our subject cataloguers now run *CDMARC Subjects* alongside an *Olis* session. They report that this does not just save desk space. The CD search software gives more points of entry to the data, and they find it faster and more pleasant than microfiche to use. Nevertheless, large sets can induce waits of a minute or more, and they like then to work on *Olis* until the CD 'busy' light goes off, indicating completion of the search.

With a little help getting started, they have mastered the macro facility and have set up for themselves a plethora of soft-keys which will deliver long DOBIS/LIBIS command chains and the free floating sub-divisions they use most often.

Our subject cataloguers have chosen to use a mouse to cut and paste headings into *Olis*. Not only have they found this method saves effort, but they appreciate very much its accuracy as they do not have the authority to delete their mistakes from the system, but must report them in writing to catalogue maintenance. It may seem strange to German ears, but some British will panic when have to transcribe unfamiliar composites terms, such as one I recently had the pleasure to mouse, 'radioallergosorbent test'.

ii. Copy cataloguing with EBSCO's The Serials Directory

We have just completed a project to retrospectively convert a sample of 2,500 serials titles in preparation for the Radcliffe Science Library's pilot

implementation of the DOBIS/LIBIS Periodicals Control module. The nature of the sample was such that, if we had used our usual sources of catalogue records, we would have expected to have to resort to OCLC, the costliest, for the majority of them. We experimented with *The Serials Directory* on CD-ROM as an alternative source of records and found there were advantages: the subscription is considerably less than searches on OCLC would have been; it is more user-friendly and, without the problems associated with working on a remote host in another country, it was always there.

MARC records can be saved in a file on disc which is then processed by a local program called RECAST. This converts records into the same format as those downloaded from OCLC, thereby allowing them to be loaded into *Olis* by established means.

We are dissatisfied with the software on several counts, and have voiced these complaints to EBSCO.

(1) The diacritics have been stripped from the original records.

(2) As an eye catcher, the title of a record is capitalized when it is displayed. Unfortunately, so is the entire $245 field, including subfield indicators, of a MARC record saved to disc. The RECAST program returns the $245 to mixed case as far as it is able, but it does not attempt to handle proper names or German nouns, which must be corrected by extra editing.

(3) The program is memory hungry. To run it under DOS 3.30, we had to strip DOS down to the minimum, even foregoing a UK keyboard driver and reducing 'buffers' and 'files' to numbers below those recommended by EBSCO. Under DOS 4.01, we were unable to make enough memory available for it to run at all until we used the DESQview 386 program, VIDRAM to extend the DOS partition using the area reserved for EGA. This enlarges the DOS partition to 736Kb and, as mentioned above, by using DESQview to load parts of DOS and other memory resident programs into high memory, a maximum executable program size of more than 640Kb is achievable.

Under DESQview, the CD-ROM is used while logged on to *Olis*. In practice, this has meant that a title can be searched for on *Olis* and, if a record is not found, *The Serials Directory* can be searched immediately, rather than placing the title aside and searching the CD-ROM at a later date.

4. Conclusion

Though the current version is not in our opinion suitable as a general purpose front-end for our library micro-computers *at this point in time*, by making micros multi-task, DESQview 386 has already been a valuable tool in setting up the specialised procedures discussed above. Most librarians with sufficient time to read the manuals and to experiment, should be able to install and use it to effect. Few can spare that time and, if used without understanding, the program is liable to run amok. The relatively smooth introduction of the DESQview 386 procedures has depended on their being computer expertise on site to set up the systems and to provide support, particularly in the early stages. Also, the staff involved have been very interested in using a computer in this way, and keen to exploit the new possibilities it offers. They have found it stimulating and we count this among its benefits.

There are improvements which would make it more accessible to the not so computer-literates.

a. When inputting program information, there should be an option to specify that it can only be opened once.

b. It should be possible to specify precisely what can be run from DESQview, or for Quarterdeck to provide a run-time version without configuration options, in order to provide a 'tighter' environment for the end-user. This would enable the developer to tailor DESQview to be sufficiently robust for his users. For those who use it as a desktop, it could also save much executive time spent sizing, moving and colouring windows.

c. DESQview has a simple screen-saver, but it only works within itself. We like to run DESQview 386 as an option on a menu, but screen-savers interfere with DESQview. We should like to see the development of a screen-saver that can be loaded before DESQview[7].

d. The ability to scale text would permit display of 'full-screen' windows next to each other. Our users would prefer that to our current practice of stacking full-screens behind each other.

We expect to continue developing applications like these using DESQview 386. We shall be comparing it with Windows 3.0: early reports suggest its performance is unpredictable and considerably slower if you have only 2Mb of memory[8]. Perhaps next year's machines will come with 4Mb as standard!

References

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SMART, H., "Windows breakthrough", *What Micro?*, August 1990, pp. 46-48.

SWARBRICK, G., "Windows 3.0", *Personal Computer World*, July 1990, pp. 128-134.

Endnotes

[1] The title was to have begun simply "Micro Management . . .".

[2] In order that a machine left at the DOS prompt can be easily restored we include the following statement in the autoexec:
prompt $_*** Enter MENU for Applications Menu ***$_$_pg
We also create a batch-file, \HELP.BAT, which calls the menu system, but we have so far failed to produce the command '?', which will not surprise DOS experts.

[3] ROBERTS (1989) discusses the general problem of conflict between 'screen-savers' and programs like Windows and DESQview. His solution is simply not to use screen-savers. Unlike us, whose machines are on while the library is open 13 hours a day, he appears not to have experienced screen-burn.

[4] Four of the 35 *Olis* libraries have retrospectively converted their catalogues. The others have, by and large, only entered on to the system items acquired since 13 September 1988.

[5] Much background information about the *Olis* project, including a description of the current routine cataloguing procedures has been given in PRICE (1990).

[6] Some operators have used a mouse to take bibliographic details in the other direction, from *Olis* to the local database.

[7] We should like a screen-saver which really is woken by any key press and which will not pass that key-press to the underlying application. We also favour leaving a faint image on the screen so passers-by realize the machine is on. A program which will provide these features if DESQview is not being used is *Burn*, distributed in the U.K. by S&S Enterprises, Ltd.

[8] See SMART (1990) and SWARBRICK, G. (1990), whose verdicts have been confirmed by a colleague of mine at Oxford.

CD-ROM-Retrieval in Heterogenous Networks Conceptions, Solutions, Conclusions and Influence on Library Management

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CD-ROM-Retrieval in Heterogeneous Networks Conceptions, Solutions, Conclusions and Influence on Library Management

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Abstract

Chapter A: Conceptions

CD-ROM-RETRIEVAL is evolving from a locally based solution towards a much bigger concept, involving LOCAL and WIDE AREA NETWORKS. This lecture will try to put forward different technical means ideal in supporting CD-ROM-RETRIEVAL on hardware without vendor supported software for CD-ROM-RETRIEVAL.

Chapter B: Solutions

It is possible to provide a solution to realize a retrieval system with combined components from different vendors and capabilities to have accessibility from remote or local platform to CD-DATABASES.
Such a solution is theoretically built and is used as an example for the installation of a CD-ROM-RETRIEVAL system layered on a PC-NETWORK which is accessible from PCs, VT100-terminals on UNIX- or DEC/VAX-host and 3270-terminal on IBM-hosts which are connected to a local CP/IP-network or a wide-area X.25-network.

Chapter C: Conclusions

In conclusion, the discussed concepts and solutions touched on by this lecture will prove that CD-ROM-RETRIEVAL is a viable

and cost effective method, on virtually any hardware and software environment and independent of the operating system. Especially MS-DOS-based retrieval software capable to run on VT100 or 3270-terminals is opening up new possibilities in HOST-PC-connectivity.

Chapter D: Influence on library management

All these developments will influence library management. Taking into consideration the wired hardware and software complexity, and with regards toward local and remote accessibility, security and juristic aspects in such a CD-NET, the CD-NET can only be managed by a specially trained person: a CD-NET ADMINISTRATOR, who is responsible for the above mentioned concerns and the trouble free operation of the system.
The lecture will therefore try to develop a profile of a CD-NET ADMINISTRATOR and describe his daily concerns.

CD-ROM-Retrieval in heterogenous Networks

Conceptions, Solutions, Conclusions and Influence on Library Management

CD-ROM-retrieval was originally designed for LOCAL applications. The problems with network licenses and legal considerations still existing today prove that even the CD-ROM-producers themselves did not imagine and plan this new technical possibility.

In my lecture I want to present to you viable solutions for CD-ROM-retrieval in PC-networks and - in addition - ways to share MS-DOS-based CD-ROM-retrieval in heterogenous networks.

Chapter A. Conceptions

The typical elements of a local CD-ROM-station are:
- an IBM-compatible personal computer
- a CD-ROM-player connected to the PC with an interface card

Heavy use of such CD-stations causes a lot of well known problems:
- manual changing of the CD
- asking around and looking for the required CD among other users
- installing software updates and new releases

and
- a linear cost line per application

So, multiple access to the same CD-ROMs and a centralized software management were often discussed.

In general, PC-networks are based on a client-server model. Exactly the same way has to be chosen for CD-ROM in network.

So the first and basic conceptual element is a CD-ROM-Server, a machine running a dedicated operating software which controls access to multiple CD-drives connected directly to this server. The local PC who wants to access a database located on a CD directs his inquiry via a

network adapter and a network cable to the server which then accesses the CD, retrieves the data from the CD and redirects this data to the PC and the loaded retrieval software.

Such a pure CD-network frees the PC of having its own CD-drives and dramatically decreases the investments for CD-drives and single-user-licenses. The up-to-now linear cost line per application now changes to a digressive one. On the other hand, all the PCs have to be equipped with network adapters and a cabling system has to be planned and installed.

The end-user now has nothing more to do manually with the CD. The CD-stored-database does not look different to a fixed-disk-database.

Concerning the software updates and changes in software releases, nothing has changed so far. Each retrieval program has to be stored on each PC, because the CD-ROM-server only manages the CDs and NOT the retrieval programs!

The central storage of retrieval programs can be done by a central network fileserver, which is the second important conceptual element of CD-ROM-retrieval in networks. The network server is running a network operating system, which shares pheriperical units of the server like fixed disks or printers to all PCs connected to that server.

Only CD-ROM-Server and network-file-server together change CD-ROM-retrieval from a local to a centrally managed database solution. They do their jobs absolutely independent from each other, they don't even know and influence each other!

Giving the users access to such a complex network forces the library to think over a user-interface, in other words a menu system, in which the user can choose the retrieval programs he wants to use and which can easily integrate add-on-software, for instance for collecting stored export files and converting them to an internal format. So a Menu-system is the third important conceptual element for CD-ROM-retrieval in networks.

As libraries are complex institutions with complex connections to other institutions, CD-retrieval should not only be accessible INSIDE a PC-network in the library itself, but should also be accessible through remote PCs AND terminals of host-computer systems. So the fourth important conceptual element of our CD-network is an ACCESS Server which lets remote PCs, VT100-terminals and IBM-3270-terminals running MS-DOS-based software via telephone lines, X.25-packet-switched net-

works and TCP/IP-networks. I will later explain the access server in detail.

Advertisements of Meridian Data, producer of CD-NET-systems in USA claim: "Just plug it (the CD-server) into your network and ready to go". This is right if they only mean the physical act of connecting the network cable to the CD-server. It is absolutely false concerning the PCs which shall access the CD-server, because here we have the problems!

(Picture 1: PC-memory)

Let's therefore have a glance at the PC, on which the retrieval is done. This poor machine has to load a lot of resident driver programs,

- network drivers for accessing the Network fileserver
- network drivers for accessing the CD-ROM-server.
- CD-ROM-device-driver
- MSCDEX-extensions

and above all, it has to load MS-DOS and the retrieval programs, which are sometimes huge.

Loading one piece of software after the other would, in many cases, end with a crash for this PC. Books in Print plus, for instance, needs as much as 539 KB of free RAM, leaving about 100 KB for DOS and all those resident drivers. This can only be achieved with the fifth important conceptual element: the so-called expanded memory manager which loads the drivers in unused regions of the PC RAM. Because these memory managers work especially well with 80386-processors, these CPUs should be preferred for PCs in CD-ROM-networks.

As sixth conceptual element I want to point to the network adapters, which manage together with the cabling system the network traffic. The available adapters vary on many points, depend on the cabling system, and the price should be only one element in the decision. I will discuss the important role of the network adapters for future applications and open systems later.

Now let me sum up all the conceptual elements for CD-ROM-networks once more:

1. CD-ROM-Server and Server software
2. Network file server and network operating system
3. menu system
4. access server

5. expanded memory manager
6. network adapters.

Chapter B. Solutions

The conceptual elements now have to be brought to life, that means we have to find the components on the market which do the job and we have to integrate them to a well-configured system.

A short notice of my own:
The problems of today cannot be solved with the technology of tomorrow, therefore I always concentrate on solutions which run today but which are sometimes not perfectly standarized. But these solutions don't only exist in fantasy, but run in reality today. Just think of the never-ending story of the OS/2.

Before discussing the different products, I have to inform you about a dilemma now arising for me. In presenting viable solutions I cannot be very objective because I am talking about products which our company is selling and installing and others which are competitors to our preferred products, but I will try to explain to you why we decided to choose the one and not the other product.

1. CD-ROM-Server

In Europe there are, among others, 3 leading products:

LANtastic
Meridian Data CD-NET
Online (Optinet)

The criteria for further discussion are:
performance and practicability

(Picture 2: OCLC-test)

As a performance test I will present to you a test published in the OCLC Micro Journal of August 1989. In this test the above mentioned 3 products were tested and compared. The test results show clearly that LANtastic is the best in single user access, but Meridian Data outperforms both in multiple access with multiple users. Here Meridian Data is twice as fast as Optinet.

This test was done with the older Meridian CD-NET software version, the newest 3.0 version increases the speed much more by simultaneously accessing the different drives via special SCSI-adapters.

Where do these differences come from ?
They come from the way the CD-server-software manages the access and the internal caching.

(Picture 3: CD-NET-Caching)

Concerning practicability the Meridian Server seems to be specially designed for power use. This system is the only one available which offers two separated air cooling systems, one for the processor and one for the CD-drives where the CD-drives are cooled by filtered air, thus preventing the drives from contamination and holding them in very constant state.

2. Network Operating System.

The previously discussed CD-ROM-server-systems can be combined with a network file server running under

- Novell
- 3Com
- MS-LAN or
- Ungermann-Bass

network operating system.

In the short time available it is impossible to discuss in detail these operating systems. In most cases we install Novell. For the heterogenous connectivity discussed later, Novell is at the moment the only possiblity.

3. Menu System

There are many different Menu Systems offered on the market. For CD-Networks it is - beside the basic menu function of easily choosing different retrieval programs - very important to know which CD-database was used

- how often
- how long
- from which PCs

and

- which problems had arisen.

We didn't find a solution for these special tasks on the market, therefore we programmed our own solution which makes all these analyses possible by protocolling the start and stop time of all CD-programs in a central database.

(Picture 4: Menusystem)

So after a period of time you can analyse many different statistical values. The data can be shown in graphical form or in pure number columns.

This makes CD-retrieval transparent, helps those supporting the network and defining alarm indicators, and helps the library to analyse the usage of the CD-ROMs.

4. Access Server

This machine is the basic component for building up heterogenous networks. In fact, at the moment we can only offer it for Novell-Networks. I don't know any comparable product for the other network operating systems.

The idea is to integrate multiprocessor-cards from CUBIX Corp. as a so-called bus-based local area network in a Novell bridge. The mini-PCs on that card (up to 4 on one 16-Bit-adapter) can be configured with a VT-100-BIOS, so they expect an VT-100 terminal or compatible as I/O-device instead of a PC-screen.

(Picture 5: Access Server)

Instead of directly connecting the VT-100-terminals by RS.232 to the mini-PCs you can connect the mini-PCs to a terminal server. Now every terminal on a UNIX-system or a DEC/VAX-host can access this terminal server via TCP/IP or LAT. Only the screens and the keystrokes are transmitted, the retrieval software runs on one of the PCs on the multiprocessor cards. When the terminal server runs in a rotary host modus, then it finds itself which PC is free and can be connected to a calling terminal.

What works well with terminal servers also works well with packet-switched networks. So connecting a X.25-multi-PAD to the multiprocessor card is possible, too.

Making IBM 3270-terminals able to run MS-DOS-based CD-retrieval is possible too, but more complicated. If you take DAVOX-cluster-

controllers instead of IBM cluster controllers then you can directly connect the RS.232 interface of the DAVOX-cluster-controller to the multiprocessor card. The other possibility should be to use an IBM communications controller, but we haven't it tested yet. As good proof for the practicability, I will present to you a chart showing an installation at the Citibank USA.

(Picture 6: Citibank installation)

This method of making host terminals the I/O-devices of high-integrated PCs can be subsummed under the term HOST-PC-connectivity. In the August edition of the German DATACOM I have published an article about this solution.

For remote PC-access the multiprocessor cards can be used, too. Then a communication software like Carbon Copy or CO/Session has to be loaded into the little PCs of the Access Server and the remote PCs. Connecting both via Modem and telephone line then makes remote PC access possible.

Our Access Server pushes the CD-ROM-retrieval out of the PC-world, but - and I will repeat it 3 times but, but, but there some restrictions which have to be understood:

- a VT-100-terminal has 24 lines, a PC-screen has 25 lines (this results in sometimes scrolling the screen up or down 1 line)
- the retrieval-programs are specially designed for PC-screens and often loose special effects in the VT-100
- only the first 127 ASCII-characters are transmitted
  so: BIP or Bookbank work well, but VLB looses the german Umlaute, and even more problems arise in the Scandinavian countries
- the PC-function keys have to be emulated on the VT100-keyboard to be double or trice strike combinations.

5. Expanded Memory Manager

Different software solutions are available. I would like to mention the Quarterdeck QEMM386-Manager which allows one to load device drivers into the unused High RAM and thus freeing the working RAM.

In particular, I want to inform you about a very easy way to add more working memory to a PC:

Most retrieval programs don't need the graphic capabilities of an EGA or VGA adapter, so you can easily add the 96 KB of the graphic memory of the EGA/VGA-adapter linear to the PC-RAM, then the PC has 736 KB RAM instead of 640 KB.

6. Network Adapters

Installing a network today forces a decision concerning the network adapters. Living in a changing world of protocols and network operating systems, a library cannot afford to invest in isolated solutions. Therefore, we always claim to buy adapters with multiprotocol-stacks. A multi-protocol-stack allows the network adapter to run different network protocols at the same time.

With these adapters the most duzzling discussions about PC-networks versus UNIX, Novell versus OS-2-LAN-manager can be stopped. The multiprotocol stack makes the PC capable of being logged into, lets say, a Novell-fileserver and a UNIX-Host simultaneously. Or, if you buy a Novell network today and if you find OS/2 very interesting in half a year, then just add the OS/2-server to your network and let the PCs be logged into the Novell and the OS/2-server at the same time, thus offering the individual advantages of both systems to the users.

Multiprotocol-adapters are available from Schneider & Koch, which are also among the fastest adapters available. They offer Ethernet, Token Ring, T1 and FDDI.

Chapter C. Conclusions

With the above mentioned components, viable solutions can be built up for CD-retrieval in networks. The stability of the Meridian server has been proven by the first European installation of the CD-NET 314 done by our company at Lange & Springer, Scientific Booksellers in Berlin, where 12 different bibliographic CD-databases are accessed from 16 heavy users in a Novell network with Schneider & Koch-Ethernet-adapters. Up to know this seems to be one of the most complex CD-installations in Europe.

The practicability of the Access Server has been proven in a test environment at the Bielefeld library. The test was done accessing the OPAC using the DFN via TCP/IP.

CD-ROM-retrieval in networks has now passed the testing phase.

It has become a very interesting solution for those libraries who want to better their services for the students and the educational staff.

A protocolling menu system allows one to analyse the usage of the CD-databases, thus giving the responsible person clear facts to decide on further CD-ROMs to be integrated.

But, CD-ROM-retrieval is a complex solution with many different components which only work well when they are well configured.

Chapter D. Influence on Library Management

Contributing to these facts, the CD-NET in a library has to be managed and supervised by a responsible person - the CD-NET administrator.

He is the interface between the users and the library stuff on one hand, and the university computer crew and the installing company on the other hand.

He installs new retrieval-updates, controls the usage of the CD-ROMs and the stability of the CD-ROM-network.

He installs new CD-retrieval programs and integrates them into the network.

He manages the user access rights on the network and inside the menu system.

He publishes usage charts of the different CD-ROMs and calculates the retrieval costs per minute, thus making online and offline retrieval comparable.

He collects information about bibliographical databases and looks at developments and changes on the CD-market.

He is responsible for the periodical file server backup.

He permanently documents the whole system.

He is a librarian and a network specialist.

In the end, he is the seventh important - not conceptual - but human element of a CD-ROM-network. This element cannot be bought, it has to be developed inside the librarian team. This development must be planned beginning with the moment where a library decides to install a CD-ROM-network. This is a new task for efficient library management.

References:

Bradley Watson and Jon Fausey, "Relative Performance of Three CD-ROM Network Access Products", OCLC Micro Vol. 5, No.4, August 1989.

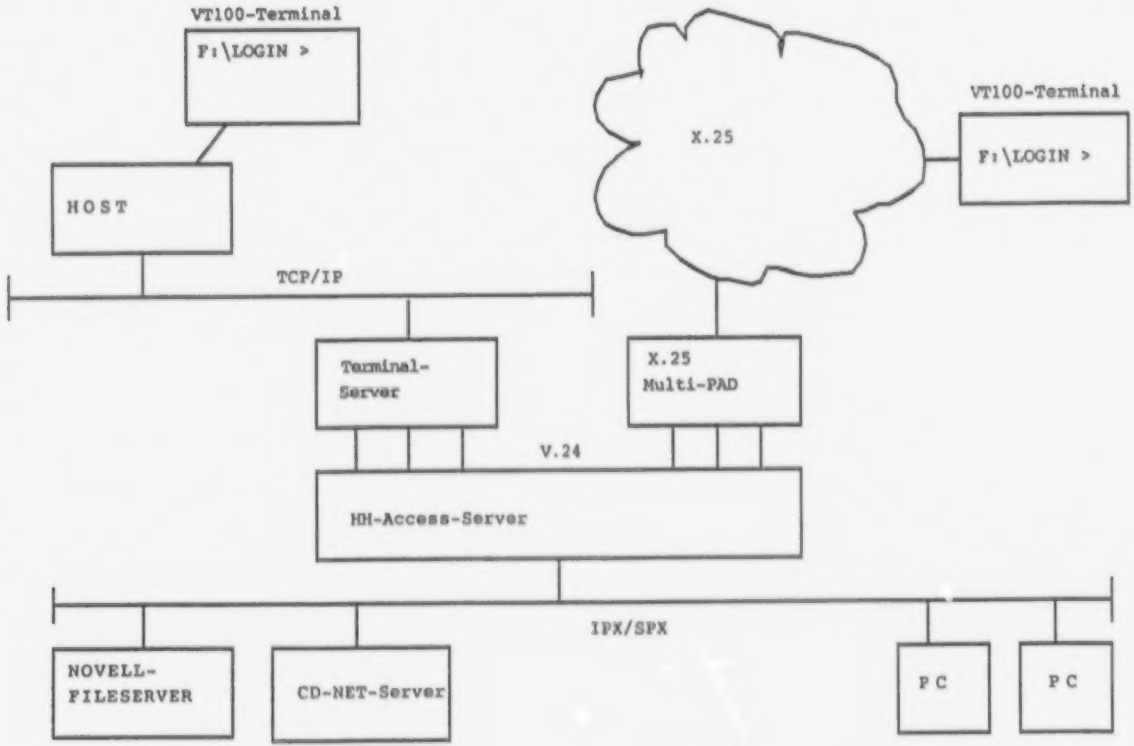
"Citibank Uses CD-NET Savings Plan", Meridian Data CD Publisher News, May/June 92.

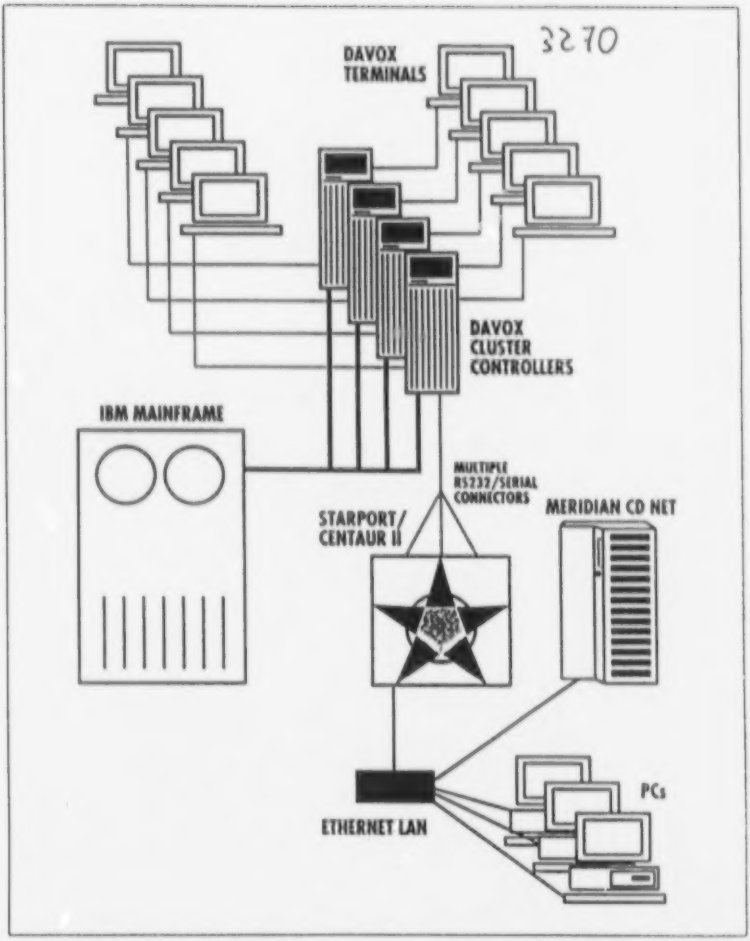
Christian Heinisch, "Host-PC-Kopplung", DATACOM 7/90.

Protokollverwaltung				
Datum	Programm	Nutzung von	Nutzung bis	User
01.10.90	BOOKBANK	09:13:40	09:29:00	CD1
01.10.90	BOP	09:13:42	09:18:02	CD2
01.10.90	BIP	09:17:28	09:22:15	CD3
01.10.90	VLB	09:29:10	09:32:41	CD1
01.10.90	BOOKBANK	09:35:15	09:38:22	CD3
01.10.90	ULR	09:35:34	09:37:00	CD1
01.10.90	SERIALS	09:37:13	09:43:34	CD2
01.10.90	DB	09:40:56	09:51:21	CD3

Programmnutzungsanalyse				
Programm	Anz.Aufrufe	Zeit gesamt	Zeit	Zeit max
BIP	242	52.37	8.46	2.01
BLC	5	0.05	0.02	0.02
BNB	2	0.05	0.05	0.03
BOOKBANK	166	32.35	6.31	1.58

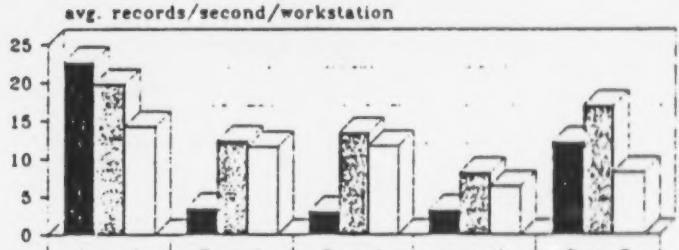
Programm BIP				
Tage : 6 Stationen : 10	Aufrufe Anzahl	Nutzungsdauer Stunden	Nutzungsstop Anzahl	
gesamt	242	52.37	1	
maximal		2.01		
ϕ pro Tag	40.33	8.46	0.17	
ϕ pro Station	24.20	5.16	0.10	
ϕ pro Tag/Station	4.03	0.53	0.02	
Stationen				
00005A10A2C9	2	0.03	0	
00005A10A30E	66	8.41	0	
00005A10A31A	69	17.46	1	


VT100-Terminal
F:\LOGIN >
HOST
TCP/IP
X.25
VT100-Terminal
F:\LOGIN >
Terminal-
Server
X.25
Multi-PAD
V.24
HH-Access-Server
IPX/SPX
NOVELL-
FILESERVER
CD-NET-Server
P C
P C



With Gandalf's Starport/Centaur II system, users on mainframe terminals have access to compact discs on a personal computer network.

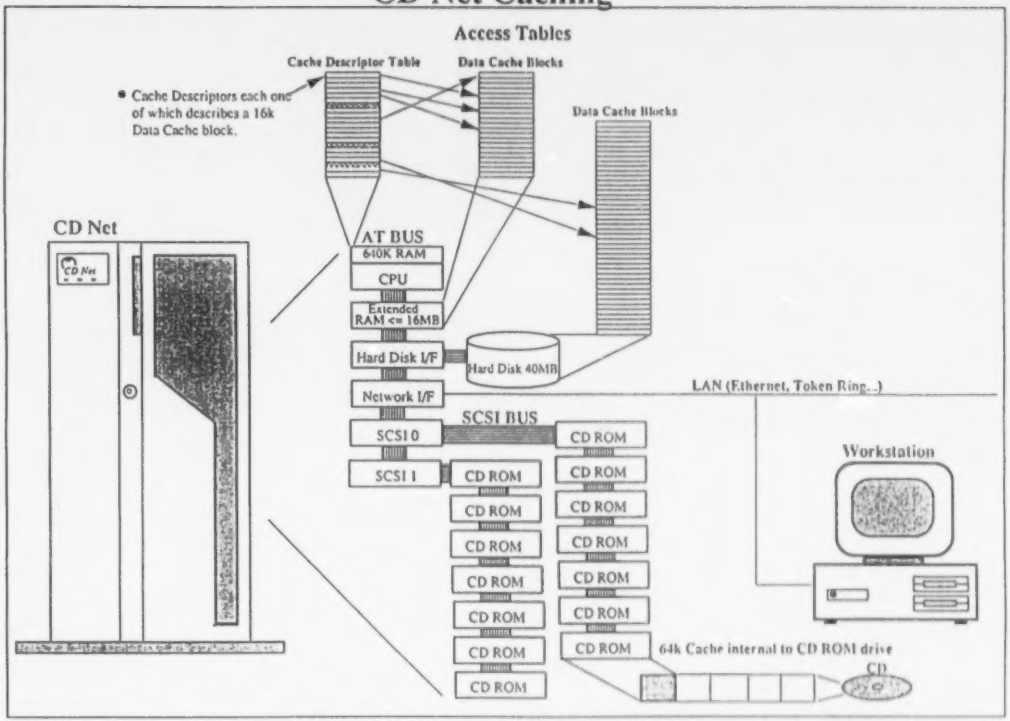
Networked CDROM Server Comparison
Average Performances



	1 on 1	2 on 1	3 on 1	4 on 1	2 on 2
LANtastic	22.701	3.442	3.007	3.194	12.154
Meridian	19.769	12.332	13.372	8.118	16.954
Online	14.249	11.573	11.669	6.361	8.213

#workstations on #drives

CD Net Caching



Der 1-MB-Addressraum des PC

PC im Novell-Netz:

1	KB	Interrupt Area
0.3	KB	BIOS Data Area
0.5	KB	System Data
55	KB	DOS
5	KB	Program Area
15	KB	IPX
30	KB	NET3
40	KB	NETBIOS
493	KB	Available
**********		640 KB **********
96	KB	VGA Graphics
32	KB	VGA Text
32	KB	Video ROM
16	KB	Netz-Adapter
184	KB	Unused

PC im Novell-Netz mit CD-NET:

1	KB	Interrupt Area
0.3	KB	BIOS Data Area
0.5	KB	System Data
55	KB	DOS
10	KB	Program Area
15	KB	IPX
30	KB	NET3
40	KB	NETBIOS
30	KB	MSCDEX
458	KB	Available
**********		640 KB **********
96	KB	VGA Graphics
32	KB	VGA Text
32	KB	Video ROM
16	KB	Netzadapter
184	KB	Unused

Memory Manager und
PC im Novell-Netz mit CD-NET:

1	KB	Interrupt Area
0.3	KB	BIOS Data Area
0.5	KB	System Data
55	KB	DOS
10	KB	Program Area
15	KB	IPX
30	KB	NET3
40	KB	NETBIOS
30	KB	MSCDEX
559	KB	Available
**********		736 KB **********
32	KB	VGA Text
32	KB	Video ROM
16	KB	Netzadapter
184	KB	Unused

Memory Manager und
PC im Novell-Netz mit CD-NET:

1	KB	Interrupt Area
0.3	KB	BIOS Data Area
0.5	KB	System Data
55	KB	DOS
10	KB	Program Area
670	KB	Available
**********		736 KB **********
32	KB	VGA Text
32	KB	Video ROM
16	KB	Netzadapter
15	KB	IPX
30	KB	NET3
40	KB	NETBIOS
30	KB	MSCDEX
64	KB	Page Frame

PC im Novell-Netz mit CD-NET:

1	KB	Interrupt Area
0.3	KB	BIOS Data Area
0.5	KB	System Data
55	KB	DOS
10	KB	Program Area
15	KB	IPX
30	KB	NET3
40	KB	NETBIOS
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458	KB	Available
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30	KB	MSCDEX
64	KB	Page Frame

Co-Operative Bibliographic Utilities as a Platform to Support Library Automation and Catalogue Retroconversion in Local Library Systems

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Co-operative Bibliographic Utilities as a Platform to Support Library Automation and Catalogue Retroconversion in Local Library Systems

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Abstract

Co-operative bibliographic utilities represent valuable tools for supporting library automation. Their databases as bibliographic resources contribute to the regional and nationwide information of holdings.

On this platform a variety of products has to be developed to fit the needs of local library systems to make their automation projects run. This paper will discuss some of these aspects from the view of a co-operative bibliographic utility serving libraries with different demands. It will be pointed out that the services offered have to be considered with the consequences for library management in mind.

As catalogue conversion projects tend to become tasks of major interest and importance for German libraries in the near future, some assumptions are made for generating procedures to fulfill the demands of the libraries. International co-operation has to result in flexible instruments to convert data derived from different bibliographic formats.

Last but not least, technological innovations should be evaluated and adapted by the co-operative bibliographic utilities to develop ready-to-go models for the library systems connected, thus building up a toolbox-like product line to encourage libraries to consider new technologies that might increase their productivity.

Co-Operative Bibliographic Utilities as a Platform to Support Library Automation and Catalogue Retroconversion in Local Library Systems

Future trends of automation in libraries connected to a co-operative bibliographic utility in Germany will depend on the status of the projects developed or running so far and on the future demands of the libraries. The latter may consist in new ideas based on the developments of other comparable libraries or may be forced by the necessary steps in the automation lineup, e.g. from automated circulation and catalogue production towards online public access catalogues and automated acquisition procedures. A co-operative bibliographic utility was installed to resemble a nucleus for library automation in the region, and it is therefore a main task of the utility to coordinate future developments to fit into the network idea without setting strong limitations for the special demands of the local library systems evolving.

A local library system in a university, as I use the definition, consists of a main university library and the total number of institute and departmental libraries belonging to the university. It may also include other academic libraries of importance in town. It may furthermore include the local public library as a partner, but we do not have such a model in North-Rhine-Westfalia yet. This definition shows, that the older universities are involved in this country, where a multilayered library organization is common, whereas the new universities that started their life in the 1960s have been almost outlined with monolayered library systems with library administration concentrated at the main library.

The history of the North-Rhine-Westfalian co-operative bibliographic utility reveals that the first academic libraries connected were almost all of the type mentioned last, and thus it has not been tailored to serve a multilayered library system.

So the problems with organizing a co-operative bibliographic utility on the basis of these first 8 libraries connected may turn out today as a fairly easy advantage, because these libraries were all of the same organizational structure as monolayer library systems with one campus library

and a few departmental libraries managed by the main library. They all used the same subject catalogues, and last but not least, all of them started their catalogues almost from nil.
With the shift towards an online co-operative bibliographic utility in 1985 the system could be opened to other university libraries in the region, namely the old universities with mainly a multilayered library system, i.e. a university main library and several institute and departmental libraries, organized and run on their own. The holdings of these new partners have grown over many more years than those of the first few, the catalogues of these libraries were and may still be card catalogues, they still have a great amount of old books listed in separate and older catalogues using house rules of the 19th century. They all have different subject catalogues using different classification schemes and/or subject headings. Not to forget is the great number of institute libraries altogether with the main library forming a local library system with a great wealth of information that is spread over the campus.

Where are we now?

Services supported by the Hochschulbibliothekszentrum at present

The Hochschulbibliothekszentrum is the co-operative bibliographic utility for catalogue production of 18 libraries connected sofar. The system was started in 1973 with 8 libraries on the basis of the catalogue data of Bochum University library in machine readable form. Although this database resembles catalogue data derived prior to the cataloguing rules for catalogue production in machine readable form (RAK), this oldest slice of data represents more archaic records in structure and in the used cataloguing rules.
With the foundation of the Hochschulbibliothekszentrum, a center for supporting catalogue production in librarians terminology was also established, and is today still responsible for database integrity by means of standardizing the use of cataloguing rules, maintaining database structure concepts and the entire catalogue database by current reviewing, and updating entries of the older slices of data. These services include a lot of working capacity on the records derived from the days mentioned above.
Corrections of data are entered by the staff of this department at the Hochschulbibliothekszentrum on demand of the libraries connected. A high and homogeneous standard of data quality can be obtained by this

concept, and the libraries are relieved from some of the necessary maintainance of the data entered. The co-operative character of the utility is supported by a strong and fast communication between the connected libraries and the Hochschulbibliothekszentrum using mailbox techniques and current meetings to exchange experiences and to solve ongoing problems in due course.

Thus the support for the libraries has a twofold character. Besides the technical support maintained by the host for the database system of the utility, there is also the support of the librarians daily work.

With the evolving local library systems in mind, a variety of products has to be developed on this platform in the future. These aspects will be discussed from the view of a co-operative bibliographic utility serving libraries with divergent demands.

Sharing of bibliographic data and copy cataloguing as the basis to build up local bibliographic databases

It is the fundamental basis of co-operative bibliographic utilities that the libraries linked to the system share the entire resource of bibliographic data and make intensive use of copy cataloguing if possible. With regard to the clients served directly by the co-operative bibliographic utility and networked with the common database system, this aspect is fully integrated into library management and serves as the cornerstone for all other automation projects where bibliographic data are heavily used and needed, and that is true for mostly all automation in libraries. As long as the clients of the co-operative bibliographic utility are the main university libraries, the system can be easily overseen, and the number of persons regarded still makes direct communication possible.

But a local library system can easily consist of much more libraries than covered by the present co-operative bibliographic utility network. The University of Münster has more than 200 institute and departmental libraries, to give only one example. It is not only the question of the missing technical basis of our present system that cannot handle as many terminals as required to integrate the institute libraries into the regional utility. There are other drawbacks which have to be considered: 1. Local library systems have no homogeneous library staff with regard to professionalism, and so the quality of cataloguing skills differs widely; 2. the amount of acquisitions differs even more, so that training on the job cannot be expected as a way to improve this diversification; 3. libraries of

a local library system need a direct support not only to help them to establish an automation project within the local library system, but also to help remove psychological barriers against modern technology in the daily work of the librarian.

Local library systems should therefore reside below the level of the regional co-operative bibliographic utility, supported directly by the local main library, but encouraged to use the benefits of copy cataloguing from the regional database and other sources. As I pointed out elsewhere (1), using bibliographic data in this way should help to build up a local database with a certain degree of homogeneity to be used together with the data of the main library stored in the regional utility to support an OPAC for the local library system. Thus, development of software utilities for copy cataloguing in institute libraries with the help of microcomputers is one of the main tasks of the bibliographic utility.

Training courses in the proper use of cataloguing rules with library software is also a necessary support for local library systems. As long as these systems are still in development, organizational structures to serve the libraries locally are almost lacking in the main libraries. Coordinating the development of user guides for library software and for applying standardized cataloguing rules by the co-operative bibliographic utility help to establish a department in the main library to support the institute libraries and for serving the local catalogue of holdings. Common problems can be solved on a co-operative basis and thus the manpower required can be assigned more effectively.

The regional co-operative bibliographic utilities should support standardized cataloguing formats to fulfill the cataloguing rules for any application used in local library systems, thus looking for compatibility of records to and from their resources. This may pay off as an investment into the future as these local databases of the holdings of the institute libraries grow and may become an important supplement catalogue to the holdings of the main library, because the department's specialized literature becomes widely accessible by the local OPAC. With increasing numbers of records the quality of the retrieval functions is more and more dependent on the homogeneity of the quality of the data stored. Furthermore, a standardized format for bibliographic records supported by the regional utilities should be the basis for catalogue card production maintained locally, a demand of most of the institute libraries now starting with automation and even of the main libraries.

Communication to software vendors may be more intense and effective if they have only one powerful partner in the regional system and are not confronted with a great number of small but enthusiastic libraries with an even greater number of different demands. Standardization of formats should be followed by standardization of products that can be produced locally as output of the library software, with the advantage of a greater reliability and hopefully easier use.

Based upon these cataloguing formats, a standardized data exchange format has to be developed to exchange data between the microcomputerbased library software in the institute libraries and the local OPACs database. This exchange format should be compatible with the one used to exchange bibliographic data between the larger mainframe-based library systems in our country to simplify maintainance. As the bibliographic data exchange format is standardized as MAB in Germany, we should be encouraged to adapt the MAB format for diskette delivery issued by the Deutsche Bibliothek.

Another important support for local library systems would be the maintainance of those parameter files needed by the microcomputer based software to use the standards in cataloguing structures and to serve print and data exchange routines. This is a cumbersome part of library automation with PC systems, and a centralized support would relieve the local main library from the nitty bitty of adaptation work that has to be done with every new release of the software.

Character sets based upon standardizations for libraries as issued by the German Institute for Standardization should fairly soon be available for PC-based library software. This is still a problem that makes copy cataloguing from bibliographic utility sources down to a PC hard to use, because not all characters supported by the utility can be transmitted, so that the library eventually has to correct records derived from the utility. Since support of a standard library character set is not only a problem of German libraries, the lack of solutions in this field is disappointing. Last but not least, data storage concepts have to be reconsidered on behalf of the great amount of data derived from institute libraries not representing the standard level of co-operative cataloguing in the bibliographic utility system.

Authority files, regional library network, and nationwide services

On the other hand of library networking, the regional bibliographic utilities are in some aspects clients of nationwide utilities: the authority

files for corporate bodies, serials, subject headings, and in the near future for names of authors.

As bibliographic utilities in Germany serve their clients on a regional basis, there is strong evidence that networking between the several regional utilities and those nationwide services for authority control is necessary to provide these authority files online for co-operative cataloguing. Presently much organizational work has to be done to override the limitations of missing online support of authority files as integral parts of the regional systems. As an example, the Hochschulbibliothekszentrum takes part in developing the standard subject heading file of the Deutsche Bibliothek in Frankfurt together with the Bavarian library network. Partners in the regional network are libraries in Bonn, Münster and Trier. After indexing, their title records are linked with the records of their subject catalogue in the regional database. Still, we have to reenter this information into the system at the Deutsche Bibliothek to serve the co-operative subject heading file simply by retyping the information. Actualization of the regional files is derived by weekly tape services from the Deutsche Bibliothek.

This example illustrates that the development of new software to manage the services of the national library in the future cannot be conceptualized as a stand alone system with offline services for the clients. It has to be seen as a network kernel in the center of all the regional bibliographic utilities with some online networking to serve these nationwide services for authority control. The same is true for other authority files that we operate.

These developmental tasks considered to be necessary to provide future concepts and perspectives will demand a great amount of manpower located both at the regional utility and the local library systems. We have to free these resources from the existing staff without reduction of essential standard services.

Redesigning the assignment of personnel can help to overcome the limitations of being notoriously understaffed

Are there any conclusions? The software of today's bibliographic utilities is obsolete even to serve the needs of the near future. Enhancements must take care of authority control via nationwide authority files, where co-operative input of data can only be supported online and needs comfortable routines to provide the librarian safe and secure authority

control. Retrospective catalogue conversion projects have to fit under the hood by means of supplying data that can be imported into the existing datapools. We don't need and don't want retrospective catalogue conversion of our existing databases with huge amounts of data in machine readable form. Therefore, not only the sources to supply libraries with data for retroconversion but also the procedures and the interfaces to the regional utilities have to be considered and developed.

With huge amounts of bibliographic data in institute and departmental libraries of local library systems, special attention has to be given to the question of data management. If these local holdings should remain in a local database, OPACs have to integrate import routines for these data and for those derived from regional systems. If it turns out to be economically better to have only one regional database to serve the local OPACs, the data management of the regional systems must be developed on a much larger basis than expected. If redundant data should not occur, this is a tough developmental task.

Management of a co-operative bibliographic utility as a kernel of a library network as described before is a twofold challenge. It should serve as a technology center for library automation, and it should also support services for librarian tasks considered to be essential for the integrity of a bibliographic database to be a resource for local library systems and retrospective catalogue conversion projects.

The Hochschulbibliothekszentrum in Cologne is in an obviously better position than many of the other German regional utilities because, at first sight, the number of staff is high. Even if you do not count the staff of the central catalogue of holdings, the manpower available should be appropriate to serve the demands.

Unfortunately, this turns out not to be true. The network is still incomplete. Large libraries such as Bielefeld, Dortmund and Düsseldorf University libraries are not yet connected. A great number of technical colleges are on the waiting list. With every new client, new demands have to be served with regard to the local specificities. Every new client asks for the production of his catalogue, which may vary in detail from the catalogues of other clients. But every detail needs some developmental time to be spent in maintainance of the existing routines for catalogue production. An increasing number of clients however leads to a larger amount of maintainance of the existing software until there will be no more time left to spend on new developments or even further enhance-

ments of the existing utility system. The management of co-operative bibliographic utilities has to consider this fact seriously and make decisions supported by the community of their clients.

The only way so far to free manpower for investments in future developments would be a reduction of maintainance by reducing the product line of the utility offered to the clients to provide only a variety of standardized services. With OPACs not only in mind, but hopefully also on the market later in 1991, special demands for catalogue production should be redirected to the development of OPAC services rather than spent on the development of print routines for catalogue cards or microfiche production. With regard to catalogue production (the Hochschulbibliothekszentrum mainly produces microfiche catalogues), investment in developing new routines for microfiche output must be regarded as investing in obsolete technology.

Redirecting processor power away from the central computer system in the regional utility to the local library systems is another way to free developmental power and to serve the local demands. Microcomputers can serve as intelligent terminals for cataloguing input, OPACs can be generated to serve as intelligent interfaces between the standardized data exchange format of the utility and the special demands of the library system with regard to specialized subject catalogues, to give one example.

We cannot afford investment into a product line that will be obsolete in the near future, but we have to invest in future developments to redesign our existing regional utility system. These tasks need a variable organization of project management. Working groups should be created to solve problems. Librarians and information scientists should be integrated into these groups to increase the communication between the technologist and the librarian. Flexible creation of those working groups increases knowledge transfer and enhances motivation of colleagues to invest into new tasks. Working group solutions reduce specialization of personnel and make flexible project management of new developments easy.

Communication between different project groups is a matter of coordinated project management. I would like to encourage close cooperation with the clients of the utility as we actually do in projects, so to establish a base system of training materials for using PC-based library systems in

institute libraries and in another project to develop copy cataloguing via university networks.

Co-operative bibliographic utilities should have the power to evaluate technological innovations and to adapt them eventually to be used in libraries. As certain and sometimes innovative concepts and ideas spin the wheel of library automation, as clearly demonstrated by the Essen Symposia in the past few years (2, 3), we should bundle a toolbox-like product line to encourage libraries to consider new technologies to solve their demands and to increase their services for the patrons.

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The Management of Information Technology in Libraries

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The Management of Information Technology in Libraries

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Abstract

Information technology has become an integral part of the operation of libraries. Indeed, automation has become, for many industries including libraries, the "furnace" upon which operation depends. If the "furnace" is turned off operation ceases.

Over the last twenty years as libraries increasingly turned to information technology, we focused on matters such as functionality, the process of acquiring automation, and the operation of our systems. Much research has focused on increasing system functionality, improving the human/machine interface, and defining the steps libraries should take to acquire and operate a system. Attention is beginning to turn to the affect this technological revolution is having on the "culture" of libraries. An important part of that culture is the manner in which libraries are managed. This paper examines the impact the information technology revolution is having on the management of libraries, focusing on issues of dependance, project management, fiscal concerns, and personnel matters.

The Management of Information Technology in Libraries

Introduction

Libraries have been engaged in automating their operations for over 20 years now. During this time we have focused on the "mechanics" of automation. By that, I mean we have concentrated on matters such as functionality, the process of acquiring systems, the human/machine interface, retrospective conversion, etc.

Only recently have we begun to examine how the use of information technology has changed our professional culture. An important part of that culture is the manner in which libraries are managed. This paper examines the effect of information technology on the management of libraries, focusing on issues of dependence, management tools, fiscal concerns, functionality, and personnel matters.

Context

Before I turn to matters of substance, I want to explicitly identify my biases. First, now that we have been engaged in automation for more than two decades we should not approach information technology as a mysterious process. Second, while I use the term "information technology" in this paper to refer to automation and computing, I believe that information technology involves both print technology and computer technology. Third, we have as a profession made enormous strides in the last twenty years! We ought to be proud of our accomplishments. Unfortunately, one of the things I have learned over the years is that reality does not always conform to theory. All too often we overlook what we have accomplished and focus instead on what remains to be done. We take ourselves to task and compare ourselves to other "industries" without considering the context in which we operate.

When I worked as a systems specialist I constantly faced the refrain, "If banks can deploy thousands of ATM's (automated teller machines) throughout the country, if insurance companies can develop expert

systems, if airlines can tell instantly the status of a reservation or flight - yes, if man could go to the moon, why can't libraries have 100% system availability, have better management reports, have better OPACs, be easier to use?" The answer is really very simple: resources and profits. The Bank of America, one United States bank, spends approximately 50 million annually on information technology. Expenditures of all libraries in the United States for automation is estimated at 80 million annually. We are small players in this market. We should remember the context within which we operate and not judge ourselves in unrealistic ways.

Why am I dwelling on these points? For two reasons. First, I want to point out areas that require our attention. I do not want to criticize, nor diminish the accomplishments of the last 20 years. Rather, I want to identify evolutionary trends that we should consider. Second, I fear that our profession seeks a magic formula that will make automation easy. Automation is not easy. There is no magic formula. Rather, the formula that exists, for successful automation is:

$$SA = I + V + Tu + Hw$$

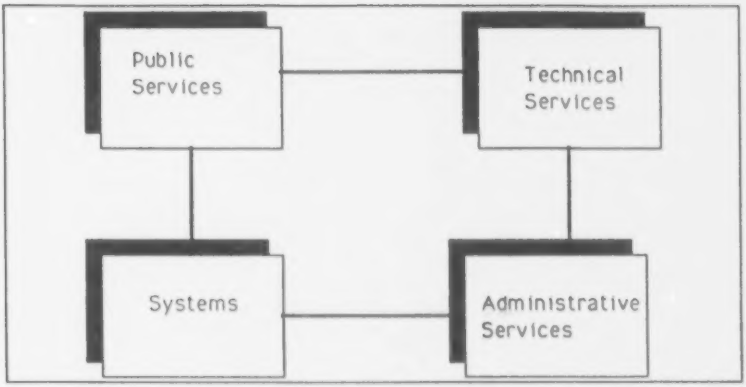
where I is intelligence, V is vision, Tu is technical understanding, and Hw is hard work! Now let me turn to substantive matters.

Dependency

Our use of information technology has greatly increased libraries dependency in a variety of ways. First, the organizational complexity of academic libraries has increased substantially over the last twenty years. We have new formats to provide to users, automation to implement and operate, increasing emphasis on interdisciplinary studies, and new standards of accountability. This increased organizational complexity combined with the use of one electronic bibliographic file by all parts of the library bind us more closely together than before. In the past, the units that make up a library would have been represented by the following figure.The units existed relatively independently, and interaction with other divisions was through formal, well-defined and narrow paths.

With the introduction of automated systems and increased organizational complexities as noted above, units have become more highly interdependent. Action taken by one division directly affects the other divisions. This interdependence is represented by Figure 2.

Figure 1
[Picture]

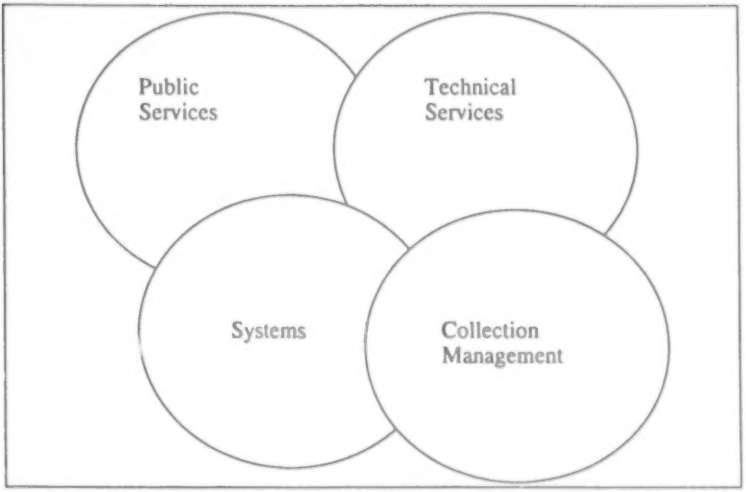


Second, libraries have become dependent upon technical experts both within and outside of the library. And third, libraries have become more dependent upon other organizations, especially other organizations within their parent organization, such as a computing center.

Why is this issue of dependency important? Haven't these dependencies always existed to some degree? The answer is both yes and no. No, in that some dependencies, such as reliance upon an external computing group to operate a system, are new. And yes, in that some dependencies have always existed, but to a much lesser degree. Libraries are dependent to a much greater degree than in the past. But, why is this important and why should we spend time thinking about this issue?

The increased degree of dependence and the dependencies on new organizations means that we have to approach matters differently than we have in the past. We can't continue to rely on "business as usual".

Figure 2
[Picture]



Communication Skills

What are some of the ways we have changed? The ability to work in groups and to manage groups has become a critical skill. As matters become more complex and as functions become more interrelated, solutions to problems and new advances cannot come from just one person or just a single unit. Rather, the skills of experts from numerous specialities will be needed. As a result, the skills needed to work constructively in a group have grown in importance. I say this because in my view:

human interaction = process + content

That is, the way one interacts is as important as the substance of the interaction. Librarians need to know when to use groups to effectively address issues. They must understand different techniques groups use to reach decisions and how to use each technique appropriately. In a similar vein, librarians should understand group dynamics - that is, the different stages groups go through.

On an individual level, librarians need well developed communication skills. This may seem self-evident, but information technology requires a level of precision that most librarians are not familiar or comfortable with. Other communication skills that are important include:

- Active listening
- An understanding of own feelings
- The ability to give and receive feedback

No matter how good our communication skills, we will still find ourselves in conflict with others from time to time. I am reminded of an intern that worked for me briefly just after taking her library degree. She had been in law school before moving to an MLS program. When she first came to work I asked what caused her to leave law. She indicated that she did not like the adversarial nature of the field. After she had been working for a week or two I noticed that she seemed very depressed. During a conversation I asked her if there was anything bothering her. As part of her internship she attended different management meetings, and she indicated that she was very disturbed by the meetings. I asked what it was that bothered her. She indicated that in library school she was taught that we were all there to serve the patron, but that at the meetings the only thing people seemed to do was argue. I replied that we were all here to better serve the patron, but that we all had different ideas as to what was better. Conflict is natural! No matter how much we want it to go away it won't. Librarians need to understand and be able to use different methods for handling conflict constructively.

Now to those of you who are saying to yourself "All this is obvious." I agree. But I would suggest that, in my experience, the obvious is very easy to overlook unless we take the time and effort to make it explicit.

Reliance On Experts

Libraries have come to rely very heavily on technical experts in matters having to do with information technology. These experts can reside in the library, outside the library, or in both places. Reliance upon such experts has a number of consequences.

As a former systems specialist one of the trends that I find most disturbing is the tendency to cast the systems expert in the role of "high priest" and then turn over all decisions that in any way involve automation to him or her. This is disturbing for three reasons. First, it sustains the myth that automation is mysterious and beyond the understanding of librarians. Second, it casts librarians in the role of victim. And third, it enables librarians to avoid responsibility for the systems they use.

Let me offer another anecdote as an example. One of the libraries I worked in had about 10 terminals stored away. As a systems specialist I was asked if the library should insure these terminals and/or place them under a maintenance contract. Now these terminals belonged to technical services so I suggested that the administrator of technical services make this decision because it was an economic decision, not a technical decision. Yet, both the technical services administrator and senior administration wanted me to make this decision because it involved terminals and therefore automation. So I relented and recommended that we not insure them because they were stored away, and therefore the chances that they would be damaged was quite small. I also recommended that we not place them under a maintenance contract since they were not in use. Well, that was not the answer the technical services administrator and senior administration was looking for. They decided to both insure the terminals and place them under a maintenance contract. Clearly, they were capable of making this decision, but because it involved automation they didn't have confidence in their judgment.

In my view, automation requires two types of decisions: (1) technical and (2) political. Technical decisions respond to the question "Can the computer do X?" Political decisions respond to the question "Should the computer do X?" Line managers should not abdicate their responsibility to address political questions to systems specialists. In a related vein, line managers should take care in defining what is technical. My rule of thumb was always "Is specialized knowledge about hardware or software needed." Reference librarians can and should decide how screen displays appear. And technical services librarians can and should define how machine-readable records are loaded into their OPAC.

Adapting to the Computer Center Culture

More and more libraries are installing automated systems that run on machines operated by the campus computing center. And those libraries that have in-house computers usually connect their machines to a campus network. As a result, more academic library staff are working directly with campus computing organizations than ever before.

Libraries are much like computing centers: they both deliver services throughout the campus, and they are frequently organized along similar lines. A library's technical services department is similar to both systems programming and operations in a computing center. The user services

department of a computing center is akin to those units which interact directly with the public in a library. Both organizations rely on a corps of highly educated professionals.

And yet for all their similarities, there are significant differences between libraries and computing centers. Libraries deal, for the most part, with intangible services. Computing centers deal with more concrete products. Libraries have traditionally been considered overhead expenses and are therefore funded through appropriations from the parent organization. Computing centers are often financed through direct fees charged back to their users. Libraries are more hierarchically organized and, as such, may be more formal and structured. What one can and should do depends upon one's formal role in the organization. Communication is also a formal process. Librarians are accustomed to functioning in this environment and they understand the protocols that are in place. Computing centers are traditionally less hierarchical, less formal, and less structured organizations. One's role is determined not so much by a formal position within the organization as it is by technical expertise.

In large, visible projects where individuals from the two different organizations must work together, differences in "culture" can lead to misunderstandings and friction. If "proper," library-type communication channels aren't used by computing center staff, library staff may misunderstand intentions and feel that they aren't being kept informed. For their part, computing center staff may feel that the library staff at times are bureaucratic, inflexible, and unresponsive.

Given the potential for misunderstanding that this mix of organizational cultures holds, what can the two groups do to increase their chances of working together successfully? The answer is twofold. First, both groups must strive to understand the other's culture. Second, both groups must be willing to work out compromises even though such arrangements might be contrary to their cultural norms. Conveying this view in a large organization, be it a library or a computing center, is a difficult task, and may never be achieved completely. But senior administrators and project managers must be able to take a broad viewpoint if the two groups are to work together successfully.

Planning & Project Management

Increased complexity and interdependence makes the ability to plan and manage large projects critical skills. By project management I mean

- the scheduling and allocating of resources
- monitoring and controlling progress
- initiating corrective action when needed

Gone are the days when a manager can keep the details of a project in his mind. Today's projects require tools such as CPM, Critical Path Method, or PERT, Program and Evaluation Review Technique.

Reliance upon information technology calls for the use of more sophisticated management tools for a number of reasons. First, the complexity of automation is such that tools are needed. The acquisition, installation, and operation of a system involves hundreds of tasks; more tasks than can be tracked without management tools. Second, as noted above, today's projects usually involve multiple units within the library and often involve organizations external to the library. Each unit must understand the project as a whole, the role it will play, and the timing of the project. In order to communicate this type of information, managers need specialized tools; natural language does not suffice. Third, there is an increasing emphasis on productivity and accountability. A system that does not function or one that functions poorly is readily apparent. Given the strategic importance of most systems used by libraries, the cost of those systems, and the expectation of productivity, librarians need to be well versed in planning and managing projects.

Higher education in the United States is becoming much more "business like". Now what do I mean by "business like" and why is this the case? By "business like" I mean that higher education is increasingly interested in concepts such as

- cost/benefits
- productivity
- accountability
- results

This is happening in the United States for a number of reasons. First, our raw material, recent high school graduates, is becoming scarce. Consequently, competition for raw material is becoming intense. Second, institutions of higher education have relatively high fixed-costs. That is, costs which must be paid regardless of the number of students enrolled. Third, the inflationary increase in the cost of higher education over the last decade has far outstripped the general rate of inflation. As a result, there is real and growing concern that we have become a "price sensitive" commodity. That is, if prices rise much more, consumers will

go elsewhere. Given these trends, institutions are seeking to control costs without sacrificing quality. Because of the high proportion of fixed-costs, mainly for labor, colleges and universities are trying to increase productivity in order to control costs.

Fiscal Concerns

This is a good time to turn to the issue of fiscal management. Simply put, information technology dramatically increases the capitalization requirements of libraries and requires libraries to deal with fiscal issues in new ways.

Frequently there is hope that automation will result in reduced costs. Based on our 20 years of experience, I think it is time to put that myth to rest. Information technology has not reduced absolute costs, rather it enables libraries to

- reallocate resources
- increase the power of the bibliographic tools we provide to users
- accommodate increased workloads without increasing staff

Nevertheless, information technology requires large capital outlays and finding such funds has proved to be a challenge for most libraries. Moreover, capitalizations is not the only fiscal challenge. Maintenance costs and depreciation, or replacement costs, must be accomodated also. Systems are like cars. When we buy one we think mainly about the purchase price and in our enthusiasm tend to forget about saving to replace the car when it no longer functions.

Why is this different from other types of equipment used in libraries? Photocopiers wear out, for example. Information technology is different for two reasons:

1. the rate at which systems tend to grow
2. the rate of technological change

Systems are never static. Pressure for growth comes from a number of areas. Bibliographic databases constantly grow in size. Users are quick to point out new features they would like. And system capacity, the number of simultaneous users, must be upgraded frequently.

Change in computer products, both hardware and software, is a fact of life, as I am sure you all know. Faster and smaller products are

introduced constantly. Terminals and printers must be replaced periodically. Most libraries in the United States do not depreciate equipment, nor do they accumulate funds over a period of time to replace equipment.

In looking at the fiscal issues involved in information technology, some general guidelines can be cited.

- Include replacement costs in your operating budget.
- View your system, both hardware and software, as a seven year investment.
- Be prepared to abandon your vendor at the end of the depreciation period.

Personnel Issues

Finally, let me turn briefly to personnel issues. It has become something of a cliche to say that information technology requires that our staffs acquire new skills. Nevertheless, it is true and it is, perhaps, the most important issue we face. Information technology has changed and is changing the rules of our profession. What is the role of a local computer catalog now that users can readily connect to national databases, such as OCLC or RLIN? On a more mundane level, How can staff improve productivity using microcomputers? The answers to these questions require a staff who are both librarian and systems analyst. Staff today must have well developed analytical skills. But what do I mean by analytical skills? By analytical skills, I mean the systematic, orderly study of an issue prior to taking action. This includes the ability to define problems, collect data, interpret the data, devise alternative solutions, review the feasibility of each alternative, and select the "best" path. Librarians need analytical skills that enable them to identify pieces of the whole and to identify new ways of fitting the pieces together.Staff must be able to break issues down into components and then try putting the pieces back together in different ways to see if improvements emerge. This is difficult for people that are trained to learn and follow rules. Staff, today, must be willing to throw away the rules they learned and try entirely new approaches. This is scary for the strongest of us. Nevertheless, it is what the times require.

I have touched on a number of topics. But, throughout my remarks there is the general theme of change and increasing interdependence. In closing, let me leave you with the notion that we have no simple or easy decision after kindergarten and there is no "right" answer in the absolute sense.

Information Retrieval / RDB

Renate Niegl

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Austria

Information Retrieval / RDB

Renate Niegl
University Library, Vienna

Abstract

Online searches within the University Library Vienna can be effectuated at three different places:
Medical information is given at the Faculty Library for Medicine situated in the AKH - Vienna's general hospital - which houses the most important University clinics.
Legal information is provided at the "Juridicum" (Schottenbastei 10-16).
The other subjects are covered by the IVS in the main building (Dr. Karl Luegerring 1). The most requested are chemistry and biology, followed by computer technology, psychology, social sciences, library information, etc.

RDB (Rechtsdatenbank) - the Austrian Legal Database is a full-text database. The most important Austrian legal journals are available. You may either search all databases together (file: ALLE), or articles (LITA), or decisions (ENTS), and there are two indices (INDE, INDL). The file EUGH contains CELEX-documents in German language.

There is an online thesaurus.
Access is possible via MUPID, via RADIO AUSTRIA and DATEX-P.
From the IVS (Informationsvermittlungsstelle) there is an in-house connection to the University Data Processing Center.

Information Retrieval at the University Library Vienna; RDB The Austrian Legal Information Database

Let me say a few words about our institution. The duty of our staff is to give information in the traditional way in the catalogue room of the Vienna University main building (2 million books). There are three more million books at the decentralized faculty libraries for medicine, theology, law, etc. On the other hand, I am responsible for on-line searches concerning law and economy as well as social sciences.

We have access to Dialog, ESA/IRS, JURIS and GENIOS, to BELINDIS for Benelux countries and there is an increasing demand for information concerning the European Community and European Integration. Databases in Austria are RDB, Social Science Information is provided by SOWIDOK (database IDAS covers also projects running or completed within the Austrian universities and other research institutions), statistical data are available at the WSR (Wirtschafts- und Sozialwissenschaftliches Rechenzentrum), INFODOC is listing up libraries and documentation centers all over Austria and was initiated by the Austrian ministry for Science and Research.

As professor Lancaster mentioned on Monday, there is not the one and only method for online-searches. My colleagues and I try to find relevant records in the different databases. Sometimes we are creating additional work for ourselves and the interlibrary loan by giving citations of proceedings or other documents that are not so easily accessible. We don't hesitate to contact the reference librarian, if we are sure that he or she will be able to give the infotmation requested in a few seconds.

As far as online-searches are concerned, it has proved to be most useful to effectuate the search in cooperation with the person who demands information. There is a form to be filled in/out. This service is free of charge for university members, for students writing their theses and for the staff of the library, because the Federal Ministry for Science and Research has granted a budget for online-searches.

Part 2 - RDB

When a project group was initiated in 1982 to develop a plan for a legal information database for Austria and to conduct market research, it was decided that solutions in other countries (as there are CREDOC for Belgium, ITALGIURE for Italy, JURIS for the Federal Republic of Germany) were too expensive. JURIS for example with its numerous databases R for decisions, L for journal articles, LS for monographs and some more requires the intellectual work of qualified professionals to offer the correct terms for subject access and was for a long time supported by governmental institutions (cf. transparency 1).

So a full-text database was realized in Austria. In 1982, the major legal publisher MANZ created a limited company with participation from representatives of the legal profession and a big bank. The publisher ORAC and EDP-professionals joined the team.

After a period of retrospective input - the Hohenecker-Index goes back to 1947, the Neuner-Zechmeister-Index was first published in 1953 - most of the journals are covered starting with 1978.

How to get the connection? RDB is installed at the EDV GesmbH, A-1060 Wien. You have the possibility to access via in-house-line, dial-up modem or RADAUS.

The database "ALLE" contains 602,212 records (by Oct. 13th, 1990) which are distributed in four databases (cf. transparency 2).

The database gives you access to the authentic document as it is printed in the journal (in case of the indices there are hints to monographs or other sources).

Data storage is based on a STAIRS system, but most of the users have decided to accept the DDS version - dialogue in German. The management of the RDB believed lawyers to be rather unfamiliar with the technique of online-searches and they are right, I suppose.

A term may be searched in the full-text. If there are too many documents, you may go to the qualified search: terms are searched only in the "Leitsatz". A list of the documents is displayed on the screen and can be printed directly. In most of the cases the student takes this short list of sources (journal, date) and has a look on the document in the printed version. A key to the library - that is what the RDB intends to be.

The lawyer will have the relevant journals in his office but will be glad to have additional information by displaying the full text of a document he requires. Highlighting is very useful in this case - by pressing the function key F10 you get only the relevant pages on the screen.

Other function keys put you to the previous page, the first page of the document, or help you to change the file or database. In addition to the Boolean operators (and = u, or = o, not = n), there is a mit = m (within the same paragraph), the adjacent function is a blank. If you have a REDOK document in your list, you have to print it totally, because it is only available online. tp 3.

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Data storage is based on a STAIRS system, but most of the users have decided to accept the DDS version - dialogue in German. The management of the RDB believed lawyers to be rather unfamiliar with the technique of online-searches and they are right, I suppose, although there is an increasing demand for instruction. A term may be searched in the full text. If there are too many documents, you may go to the qualified search: terms are searched only in the "Leitsatz". A list of documents is displayed on the screen and can be printed directly. In most of the cases the student takes this short list of sources and has a look on the document in the printed version.

REDOK originally was the first electronic database realized in Austria. Legal experts provided published and non-published decisions in machine-readable format via BTX. There is an additional field for subject indexing, the source is given, you have an abstract.

To resume the output possibilities:

1) Short list of sources
2) Authentic document on the screen
3) Printing online or offline
4) you may store it in a file at your own PC.

Let us have a look at the users:

lawyers - 32,9%, certified public accountants - 18,7%, public administration and universities - 10,8%, big banks - 21,3%, notaries - 0,6%. cf. tp 4.

Finally, I want to give an outlook on cooperations. The Federal Chancellery has finished the first stage of a project relating to federal law (statutes, statutory instruments etc. which are published in the official gazette, Bundesgesetzblatt, and its predecessors). In this way, a status compilation of all federal statutes in force is established and a classified index including all amendments was developed - RIS.

The database is ready for internal use and will be offered soon by the Information Retrieval Service for University teachers and students (inhouse-line to the University Data Processing Center is required).

CELEX - The decisions of the European Court of Justice, in German language, are already accessible by using the same DDS retrieval language.

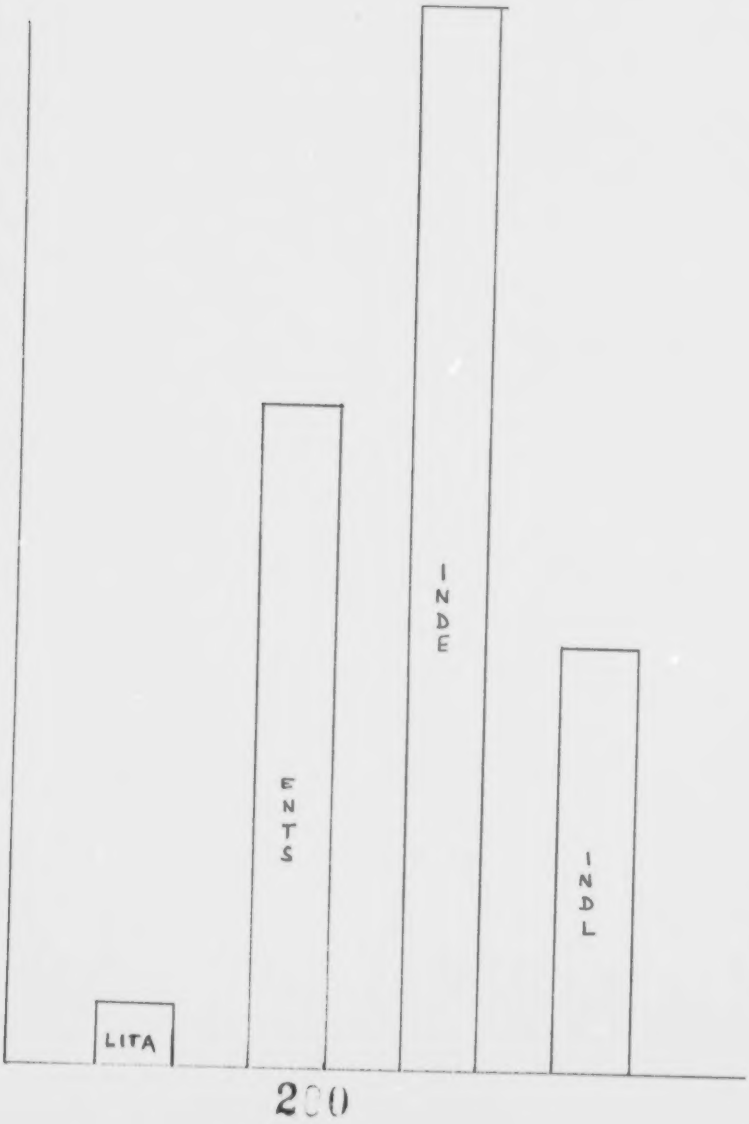
JURIS - Actually, the IVS - Information Retrieval Service of the University Library Vienna offers the possibility of searching all JURIS databases by a special contract without the intermediary of RDB. Nevertheless it will certainly be interesting for lawyers and other legal professionals to have access via their own PC's.

SWISSLEX - Some Users asked questions about Swiss law and legislation. As there is a certain amount of money to be paid per month, independent from whether you use the system or not, it would be too expensive for the time being.

A survey of all the relevant databases and files is given in a recent publication: Müller, Isolde: UBIS-Literaturinformation für Rechtswissenschaften, 3. erw. u. verb. Aufl. - Graz: Universitätsbibliothek Graz 1990, II, 64S (Bibliographische Informationen, 54.)

Gesellschafter:

- MANZ
- Orac
- EDV GmbH
- REDOK
- Angehörige der freien rechtsberatenden Berufe


LITA
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ENTSCH VwGH 16. 12. 1986, 86/14/0064.
NORM § 19 Abs 1 EStG.
§ 27 EStG.
FUNDST REDOK 10.470
SCHLAGW Gesellschaftsgeschäftsführer; Pflichtbeitrag; **Sozialversicherung**; Sozialversicherungsbeitrag; **Verdeckte Gewinnausschüttung**; **Gewinnausschüttung**; Werbungskosten; Betriebsausgabe; Zurechnung; Zufluß; Verausgabung; Gehalt; **Geschäftsführer**; Aufwendung.
LANGTEXT Pflichtbeiträge zur gesetzlichen **Sozialversicherung** für einen Gesellschaftergeschäftsführer

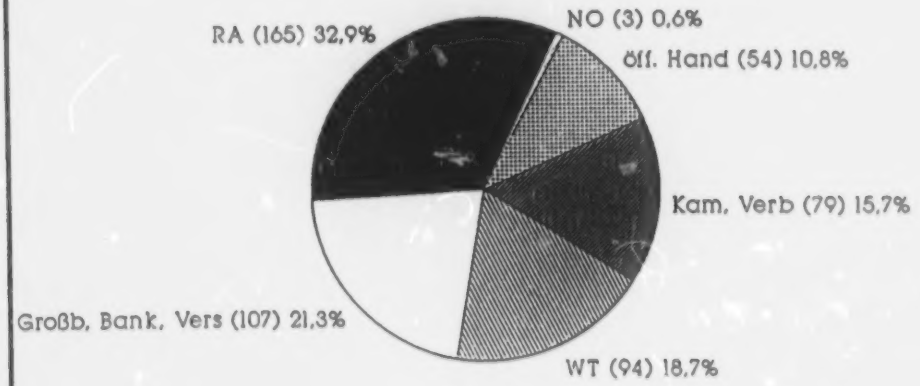
Sachv.: Der Bf ist **Gesellschaftergeschäftsführer** einer GmbH und bezog als solcher von der GmbH in den Jahren 1979 und 1980 Einkünfte aus nichtselbständiger Arbeit und 1981 solche aus selbständiger Arbeit. Sowohl die Beurteilung der von der GmbH für den Bf geleisteten Pflichtbeiträge zur gesetzlichen **Sozialversicherung** als **verdeckte Gewinnausschüttung** als auch die Zurechnung dieser Beträge beim Bf als Einkünfte aus Kapitalvermögen stehen außer Streit. Der Bf vertritt aber die Auffassung, daß die für ihn entrichteten Pflichtbeiträge bei ihm in gleicher Weise als Werbungskosten bzw Betriebsausgaben zu berücksichtigen seien, als ob er sie (aus offen ausgeschütteten Mitteln) selbst bezahlt hätte.

Entscheidung: Mit der Auffassung ist der Bf im Recht. Die ihm als **verdeckte Gewinnausschüttung** zugerechneten Beträge sind im Rahmen seiner Einkünfte aus nichtselbständiger Arbeit als Werbungskosten bzw im Rahmen seiner Einkünfte aus selbständiger Arbeit als Betriebsausgaben zu berücksichtigen. Diese Beurteilung entspricht sowohl dem Zuflußprinzip als auch dem Grundsatz, daß Zahlungen, die im Rahmen und auf Rechnung des Stpfl erfolgen, diesem zuzurechnen sind (Aufhebung). -j.ruppe-
HINWEISE AKTIVZITATE:

bestätigt:
VwGH 09 11 1983, 82/13/0001
VwGH 07 12 1982, 82/14/0110

DOKUMENTENDE

Verträge
Anteil nach Branchen
Stand VIII/1990



Gesamt: 502

OPAC Extension to Conventional Data with Bibliographic Expert Systems

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Technical University Library, Graz
Austria

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OPAC Extension to Conventional Data with Bibliographic Expert Systems

Karl F. Stock
Technical University Library, Graz

Abstract

The main aim of my talk is not only to point out the aspects of user oriented conventional and online catalogues, but also to express the use of bibliographic expert systems in facilitating the search for literature. Bibliographic expert systems should be designed to use printed knowledge, bibliographies, and other reference work to multiply the functions performed by a librarian.

When a scientist uses the bibliographic database to retrieve references related to his work, he can not be perfectly sure that he has found all the items related to the topic in which he is interested. Perhaps a multiple set of what he has found on the screen exists and thereby must be searched and detected using conventional catalogues, bibliographies and other reference works. There is a great gap between the published books and articles and the online searchable literature. Most of the articles published before this outgoing century are not accessible via information retrieval systems.

The world-wide availability and accessibility of machine readable bibliographic data in host data bases and network OPACs has led many users of library services to expect that data bases will answer all their questions and provide them with all titles of books and articles related to the subjects about which they are inquiring. This simplistic view is seen to ignore many of realities of library automation and to neglect the facts that it has only been a very short period since the invention of printing was used to create machine readable cataloguing data.

A bibliographic expert system can help the user to find more relevant titles besides the titles cited in online catalogues, especially to find more relevant information in printed reference works, bibliographies and collective biographies. Bibliographic expert systems can create an additional link between the OPAC entries and many other printed sources in libraries.

The construction of bibliographic expert systems should be performed in connection with the use of OPAC services. Reference librarians expect the bibliographic experts to save their bibliographic expertises and answers to users' questions in the OPAC - connected bibliographic expert module.

The use and exchange of bibliographic expert data between different libraries must be planned analog to bibliographic databases treatment. A full-featured bibliographic information system that offers access to all information in recorded and printed form will be the 'Multimedia OPAC supported by the bibliographic expert system.'

OPAC Extension to Conventional Data with Bibliographic Expert Systems

My talk will discuss aspects of conventional and online catalogues and the user-oriented relationships between them, and the usefulness of bibliographic expert systems and searching for ways to facilitate the finding of literature in its entirity as it relates to a specific theme. Bibliographic expert systems could be designed to augment the tasks performed by a reference librarian using their knowledge about bibliographies and other reference works in printed form. Although expert systems have been in experimental use since the 1960s, the start of reliance on library applications is a very recent trend. In the future there will be many related links between OPACs, hypermedia systems, and library expert systems. And there is no doubt that these three information technology tools are still evolving in the direction of giving and taking from each other to compliment one another. Another aspect is available in scanning techniques, which will be an accelerating aid to obtain and to store relevant data in both data forms for retrieval and/or for visual presentations.

OCLC reported[1] that 48 million of data records have been converted.This reconversion of existing bibliographic data in card-written or conventional form to machine-readable form is still going on in some countries and libraries. The methods of conversion are using other machine-readable records, by re-keying in from catalog cards, and by scanning and editing scanned data. But a lot of data still remains unconverted for many years, due to the huge amount of bibliographic data produced since the invention of printing.

When a scientist or writer uses the bibliographic databases to receive references for his work, he cannot be sure that the reference material he has found has all the information available, but rather only the information he has found online that is available. The additional set of information that he needs to locate and find must be unearthed using conventional catalogues, bibliographies, biographies, encyclopedias and other reference works. In many subject fields there is a giant gap between all the published and the online searchable literature in the form of books and articles. Most of the articles written before the end of this century are available or accessible via information retrieval systems. But the

publication of articles has existed since the first volume of the "Journal des scavants" in 1663. Many of these articles and books are still of substantial importance and of continuing interest as biographical, historical and sociological resources. This historically important literature is of permanent value and should not be ignored or forgotten. Certainly, the OPAC retrieval system is only one of the bibliographic resources that we have available. It unfortunately often poses a risk of disorientation of the user. But it is also disappointing and unnerving that you sometimes find the title of a book in an external data base, which is actually available on the nearest shelves. You simply do not realize its close proximity because you failed to consider consulting the nearest card catalogue or any bibliography. Most OPACs are currently used on an isolated basis, cut off from the larger literary world, which is indexed in printed reference materials.

The worldwide availability and accessibility of machine-readable bibliographic data in host data bases and network OPACs has led many users of library services to expect that these data bases will answer all of their questions about the titles of books and articles relating to all given subjects. The simplistic view ignores many of the realities of library automation, and neglects the fact that only a very short period of time has been used since the invention of printing to create machine-readable catalogued data. When you consider that more than 95 percent of data is still being stored exclusively on paper, we must also emphasize that this situation also concerns catalogue entries present since cataloguing activities began. The great void of OPACs can be consulted quickly, but the great treasure found in card catalogues and bibliographies cannot be searched with equal rapidity or intensity. This is a huge information dilemma for the coming years. In Austria, close to 20 million volumes are stored in the university libraries and in the Austrian National Library. Only about 500,000 catalog entries are available in machine-readable form using the MAB1 data format, and more than 500,000 are stored in other data formats. The conventional bibliographic data situation in other countries is very similar.

In addition, the future of OPACs that are based on entity-relationship data base systems are perhaps an advanced database software solution. Future library systems will also be influenced by expert and multimedia systems which can support all library organizational purposes. Indeed there is an overlap between expert systems and data bases within the framework of bibliographic data. All existing and future library services

could be enhanced using library expert systems. Eight objective categories should be developed for the various types of library activities that require expert support system:

- 1) Library management support,
- 2) Book processing (including ordering and acquisition tasks),
- 3) Cataloguing and recataloguing application systems (including scanning and tagging or field-defining tools according to cataloguing rules),
- 4) Classification and abstracting (including indexing support),
- 5) Information retrieval with OPAC support (including referencing and multimedia consulting),
- 6) Library user service and interlibrary loan,
- 7) User and library novice training and instructional support,
- 8) Decisional support for the valuation of rare book collections by indexing bibliographic informations about book auctions.

A bibliographic expert system can also help the user to find more relevant titles besides the titles cited in online catalogues, especially to find more information in printed reference works, in bibliographies and collective biographies. Bibliographic expert systems should create an additional link between the OPAC entries and the many other printed sources in their own and other libraries. In addition to the information search in OPACs, we must detect the relationships between the user-questions and the the OPAC answers, the collection holdings, and above all the reference sources in a feasible direction that encompasses all of the types of reference works available. A very advanced view of OPAC extension had been proposed by Hjerppe[2] with the Project HYPERCATalog of the Linköping University in Sweden. One of his nine intentions to OPAC extension is similar to those for referencing support:

"... contain more and other information than present catalogues, especially in terms of links and relations between fields, records, and files, and facilities for utilizing this ..." and I may add "also non-recorded bibliographic data in printed reference works".

The information provided by OPAC searching needs these linkages in order to detect every available text in printed and electronical form, including the magneto-optical form. The behaviour of many library users to totally ignore the library resources in non-electronic forms is to overlook a potentially valuable source of very important information. Except in conventional reference work done by reference librarians the bibliographic expert system should give information to other retrieval sources concerning the searched literature. It also includes librarians, who classify and abstract information and who could apply their bibliographic knowledge to supplement the expert systems. The advent of useable bibliographic expert systems in connection with OPAC creates the potential for a new window through which the amount of ancient literature in conventional catalogued form can be obtained. Another enhancing aspect of more effective access of information is the enrichement of bibliographic entries within the OPACs and data bases within the tables of contents. This is one of the innovations available on OCLC data bases[3]. Alberico[4] demands:

" ... the need to add facets to the MARC records as well methods for enriching MARC records with table of contents terms."

The keywords of these tables of contents should be linked with different catalogue entries, reference entries, and capitals in other books like in hypercard applications.

As is the case with other expert systems, library and bibliographic expert systems can also be developed from scratch or by using expert system shells. This would mean a software package constructed for the development of expert systems.

The development of bibliographic expert systems should be performed in connection with and interfaced into the use of the OPAC services. Reference librarians including bibliographic experts, should save their bibliographic expertise or their answers to user-questions in the OPAC-connected bibliographic expert modul. Alberico and Micco have a good definition[5] of bibliographic expert systems:

"The most promising AI technology for libraries is expert systems. The key feature of expert systems today is that they involve modelling the thought processes of human experts who are very familiar with the given problem domain. If you are going to build an expert system that will serve as a reference assistant, it must be done by sitting down with expert reference librarians and asking them to codify the heuristic or rules of

thumb that guide them in their decision making. By definition, one cannot build an expert system without at least one resident expert."

From time to time these answers and expertise should be restructured, compared and combined, re-edited and corrected, updated and enlarged like other bibliographic data collections in machine-readable form. The main links between bibliographic information inside the OPACs and outside in conventional form should be implemented in form of conventional relationships like authors, corporate bodies, titles, persons, geographica, subjects, and year of publication bounderies, illustrations and maps, plans, construction designs, mathematical and chemical formulas, musical notes, sound and speech, and the many other categories we use. The knowledge for each group of reference works must be elicited from reference librarians and has to be stored in a specially designed reference metafile, which should be linked to the results of OPAC questionnaires.

"Expert system technology may be less threatening to reference librarians if expert systems are viewed as another form of user aid, an interactive handout that can contain descriptions of information sources as well as rules for using them. Librarians consult handouts prepared by other librarians who have more expertise in the subject area being considered. Clients also use locally prepared handouts to help them with research in specialized subject fields. A locally published guide is a destillation of a reference librarian's knowledge about sources within a specific domain. Small systems, like our prototype, can be expected to function in similar ways".[6]

The use and exchange of bibliographic expert data between different libraries and library systems must also be planned analog to the treatment of the bibliographic databases. This would mean distributed expert systems within distributed library systems. Until now only a few library expert systems are known[7], like "Information machine" and "Answerman", although expert systems in general are coming of age. One of the earliest antecedents was REFSEARCH by Joseph Meredith[8] in 1971, which was used for representing knowledge about printed reference works as a tutorial system. Another knowledge based system for reference expertise is PLEXUS, developed by A. Vickery[9]. But still, too, few librarians are considering the development of experimental prototypes.

In Central Europe and throughout German speaking libraries there are many bibliographic experts, but only a few librarians, who are familiar with AI programming languages and tools, with knowledge engineering and systems engineering methods. Therefore we must be patient until external software houses have an economical interest in this information market sector.

Before developing good library and bibliographic expert systems, we must also complete and enhance the main systems of library automation. Bibliographic expert systems should be embedded in the larger and integrated library systems, and should also be accessible within other library networks. In this way, we will have the advantages of synergism in our combined information systems and expert data systems. In addition to these objectives we can plan and prepare a full-featured bibliographic information system that offers access to all information in recorded and printed forms. We could call this module the "Multimedia OPAC supported by the bibliographic expert system".

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2 L-2 Alberico, 1990; L-9 Hjerppe, 1986

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How to Access Online Systems in Libraries and Gaining Access to Online Catalogs through Networks

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Abstract

Higher education plays an increasingly more important role in development of a world view. And in developing a global perspective, our students and faculty must develop an interconnectedness via electronic information access.

Education must prepare the citizenry of the world to use the information infrastructure so vital to growth and development, as well as to world understanding. Information technology and linked capabilities in colleges and universities are growing quickly throughout the United States and other countries. Computer personnel, media services, and libraries have a great responsibility to work cooperatively in delivery of information services and improved access to electronic information. Much has been done to define formats and protocols for creating and sharing catalog records. National and international standards organizations are working towards improved standardization for user interfaces. Consortia are being formed to install intercampus communications networks that will connect to the proposed NREN (National Research and Educational Network) in the United States to interconnect over 1,000 colleges, universities, and research organizations. Soon this type of interconnectedness on an international scale will be commonplace. Librarians need to assume a leadership role in teaching end-users and potential end-users how to access the networks to retrieve information regardless of

where it is located. This paper will focus on some of the networks available, online library catalogs available on the networks, and methods for teaching end-users how to keep up-to-date in online information retrieval via networks.

How to Access Online Systems in Libraries and Gaining Access to Online Catalogs through Networks

Higher education plays an increasingly more important role in development of a world view. And in developing a global perspective, our students and faculty must develop an interconnectedness via electronic information access. Education must prepare the citizenry of the world to use the information infrastructure so vital to growth and development, as well as to world understanding. Information technology and linked capabilities in colleges and universities are growing quickly throughout the United States and other countries. Today more than 60% of United Kingdom libraries offer access to an online public access catalog, both locally over the campus network and country-wide over JANET (Joint Academic Network), which libraries in other countries with connections to JANET have access to as well. The SALBIN experiment in Scotland gives separate access to databases of the Scottish research libraries through JANET. Finnish academic libraries' online catalogs are available through a national information network, LINNEA, which is linked to the world-wide network through NORDUNET. OCLC has a major European presence through 20 million titles or 30% of its database. The best source of information on access in Europe is Bibliographic Access in Europe: First International Conference (Dempsey, 1990, 168 pgs.) This book offers an excellent survey of the state of bibliographic and online access to European libraries and limitations of existing access.

Computer personnel, media services, and libraries have a great responsibility to work cooperatively in delivery of information services and improved access to electronic information. Much has been done to define formats and protocols for creating and sharing catalog records. National and international standards organizations are working towards improved standardization for user interfaces. Consortia are being formed to install intercampus communications networks that will connect to the proposed NREN (National Research and Educational Network) in the United States to interconnect over 1,000 colleges,

universities, and research organizations. Soon this type of interconnectedness on an international scale will be commonplace.

New technologies for organizing and retrieving scholarly information can change basic scholarly access to libraries. In the past, it was necessary for users to come to the library to use the card catalog and retrieve information from shelves. Then as database providers began making indexes and abstracts available in electronic form, librarians still served as the in-house intermediary between the user and the online citations. The computerized catalog came along and the user became more conversant with electronic forms of access. Gaining access to these does not always require the user to be within the library itself. Bibliographic databases of broad and narrow scope, raw statistical data, full-text databases (e.g. legal decisions, encyclopedias), and even graphic images as well as indexes available only online forced librarian and user alike to become more computer literate.

Delivery of electronic library materials can now be done via connecting a library terminal or microcomputer to a central database, sometimes stored in a campus or library computing center, or in a remote data center. Often today connections to these central databases are not just found in the library itself but extend to the remote user's own workstation, through a telephone or campus network, so that electronic information flows from repository to user without the presence of a physical library building. In such cases the library may be arranging delivery, rather than delivering electronic information itself.

Large, magnetically recorded mass storage devices attached to multiuser mainframes or minicomputers and high speed networks can move massive amounts of electronic data and serve many users at once. Many academic campuses in the United States now provide such network access via fiber-optic connections between buildings and coaxial cable within them, with connections to national and even international networks to other databases.

Typical delivery of electronic information from a library is often done through:

1. Interlibrary loan and telefacsimile machines;
2. Access from library public terminals;
3. Similar access from the user's own microcomputer in the home, office, or lab;

4. Access within libraries from CD-ROM workstations and local area networked CD-ROMs; and
5. Downloading of databases or information from databases to the users' own workstations.

The library's public services/reference staff (and/or the computer center staff) generally assume responsibility for teaching remote users how to retrieve electronic information. And libraries may compete with other information agencies in this role. Competition and collaboration with campus computer centers, media services, and other information services is becoming a normal practice in higher education institutions.

A number of libraries mount commercial databases or provide electronic gateways to other vendor's electronic datafiles. Often the databases mounted locally are linked to onsite holdings. Some institutions allowing dial-up links may require charges to these remote users. Frequently the access to networks provides additional services beyond the online catalogs to electronic mail and bulletin boards, shared laser printing, and document delivery. Still the primary access, at present, is to the online library catalog, supplemented by selected additional databases, and other libraries' online catalogs, electronic indexes and reference materials beyond the catalog, including encyclopedias, journal citations, and sometimes the capability to locate and retrieve full-text and graphic materials over the network. Often the systems rely heavily on distributed file servers rather than on a single mainframe or CD-ROM.

The competitive market for electronic information has led to a bewildering array of access protocols and complex technical requirements, so that library users must learn a variety of new sets of commands and symbols for each set of electronic materials used. Some vendors and libraries have attempted to standardize search programs and command protocols for access to all of the services provided. These are rarely comprehensive enough to eliminate problems and a library's own catalog generally has different search protocols and commands than the externally accessible systems, unless these materials are mounted under the library's own system.

Currently our reference librarians must be trained in use of many different systems in order to be able to help the library user select, obtain access to, evaluate, and use the appropriate data in different electronic files. Until all information can be merged into a single format or have enhanced interfaces, some users will not be able to interconnect with the

many formats without the expert guidance of trained personnel. Librarians are the best personnel to address the educational training needs of users because of their expertise in organizing information and in serving a broad spectrum of users. Libraries are the ideal place too, for broad-based technology development and implementation. On a majority of United States campuses, libraries do not just manage information access and delivery, they assist in setting standards and planning for implementation of information systems and technologies.

Participation in national and regional information networks, tied together through a large-scale automated system has become the norm for many libraries. In the past two decades, an infrastructure of national "utilities" offering access to large bibliographic databases and regional organizations offering service and support to aid member libraries in their use of these databases has developed to the point where many libraries take the availability of these services for granted (Sugnet, 1988, p. 101.) There is now, in the U.S., an evolving national research internet developing. This network already links the bulk of the user community of libraries and even interlinks the libraries to each other and to their users. Many new resources are being made available through networks. Our users do not want to learn a new user interface for each of these resources as there are just too many. And there is a great difference between being able to make a connection to a resource and being able to use it effectively. User access and user education must be major topics of research in the next few years (Lynch, 1988, pp. 104-5.) Searching of the online union catalogs such as OCLC and RLIN, for example, continue to increase steadily, along with remote access to the approximately 100 library online catalogs now available through Internet.

In the United States, an Academic Coalition for Networked Information is developing to support the proposed NREN (the National Research Education Network). This organization is made up of administrators from over 100 institutions and organizations. Sponsored by ARL (Association of Research Libraries), CAUSE (Association for the Management of Information Technology in Higher Education), and EDUCOM, it was formed in March of 1990 to advance scholarship and intellectual productivity by promoting access to information resources through existing networks and the NREN (CAUSE, 1990, p. 2.)

Many institutions of higher education are switching to ISDN (Integrated Services Digital Network) telecommunications systems. ISDN provides

a common user interface to digital networks all over the world. It is a system that provides voice and high-speed data transmission through a single channel for long distance communication. It combines all communication services currently offered over separate networks into a single network to which any subscriber has access over common facilities through a single plug in the wall. It will bind the various communications and computing technologies into a coherent whole, connecting most major cities by 1995 and offering international coverage within the next 15-20 years. It offers high speed telecommunications services and access to databases through local telephone systems. The Academic Coalition for Networked Information will study issues such as standards, intellectual property rights, copyright (a critical problem inhibiting change), and the management and funding of the network.

The need for NREN is demonstrated by:

1. The growing emphasis on access to information;
2. The availability of information regardless of the location; and
3. Integration of campus information resources.

Scholarly communication is shifting its emphasis from ownership of information to access to information--NREN is an integral part of this. In the future, library users will have access to the world of knowledge instead of just the materials held in their local library.

OCLC will probably be made available on NREN. RLG (Research Libraries Group) is now offering access for a fee to its database via Internet. Page images can be faxed over Internet. NREN could store books and journals in full-text. Critical to the paradigm shift is cooperation among the library, computing, and communications communities.

It is reasonable to expect that libraries will become the access facilitators to a rich worldwide information base in an increasingly global network. Librarians need to assume a leadership role in teaching existing end users and new users to retrieve and evaluate information regardless of where it is located.

Currently, "the two major international scholarly networks of interest to librarians in the United States are the Internet and BITNET" (Britten, 1990, p. 103.) "Internet comprises a network of networks that provides global access to computing and information resources. It consists of the NSFNET backbone, with connections to regional, government, and

campus networks" (Britten, 1990, p. 104.) It also connects international networks in North America, Latin America, Europe, and the Pacific Rim. Many academic libraries offer services over the Internet including online public access catalogs, other local databases, newsletters, public domain software, and similar information. "Accessing these Internet resources is accomplished from a computer that is connected to the network and has resident network protocol (TCP/IP) software. Generally, information about specific methods for access are referred to the appropriate local computing center" (Britten, 1990, p. 104.)

However, there are online instructions available through Internet for each of the online library catalogs available. "If the campus is connected to the Internet, anyone connected on campus can get an account on a computer which has Internet access. The user may have to dial into this account using a modem with his/her terminal or personal computer" (Britten, 1990, p. 104). "The TELNET command allows log-in to a remote host for the purpose of using a service such as an online catalog" (Britten, 1990, p. 104.)

"Unlike BITNET, the Internet allows users in one institution to log in to another institution's computer" (Updegrove, Muffo, and Dunn, Jr., 1990, p. 44.)

BITNET is used primarily for electronic mail and file transfers. Its communications capability is much less than the Internet. While BITNET does not offer the advantages of logging in to remote systems, it has resources available including electronic mail, electronic journals, interest group forums, and file servers (Britten, 1990, p. 104.)

Joining an interest group forum is a good way to learn more about the networks. An interest group such as PACS-L (Public Access Computer Systems Forum-BITNET) is an international group of librarians communicating with each other, often to solve problems (Britten, 1990, p. 105.)

There is an excellent article on using "BITNET and the Internet: Scholarly Networks for Librarians", by William A. Britten, in C&RL News 51 (Feb. 1990), pp. 103-107.

Through BITNET-PACS-L, you can also find titles of books and directories, such as the following, for further assistance:

Arms, Caroline (ed.), Campus Strategies for Libraries and Electronic Information, Bedford, MA: Digital Press, 1989.

Centre for Bibliographic Management, Library Bibliographic Networks in Europe, The Hague: NBLC, 1988.

Comer, Douglas, Internetworking with TCP/IP, Prentice Hall, 1989.

Frey, Donnalyn and Rick Adams, A Directory of Electronic Mail Addressing and Networks, Newton, MA.: O'Reilly and Associates, 1989.

Karrenberg, Daniel and Anke Goos, European R&D E-Mail Directory, Buntingford, Herts, England: European Unix Systems Users Group, 1988.

Krol, Ed, Hitchhiker's Guide to the Internet, Urbana-Champaign: University of Illinois, September 1989. [Internet document]

LaQuey, Tracy L., The Users' Directory of Computer Networks, Austin, Texas: The University of Texas System, July 1989. (April 1990 as The Users' Directory of Computer Networks, Tracy L. LaQuey, Bedford, MA.: Digital Press, 1990)

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Office of Management Resources, Remote Access to Online Catalogs (SPEC Kit # 142), Washington, D.C.: Association of Research Libraries, 1988.

Partridge, Craig and Karen Roubicek, Internet Resource Guide, Cambridge, MA.: NSF Network Service Center, October 1989. [Also available online]

Quarterman, John S., The Matrix: Computer Networks and Conferencing Systems Worldwide, Bedford, MA: Digital Press 1990.

Spurgeon, Charles, Network Reading List, Austin, Texas: University of Texas at Austin, 1989.

Other examples of printed sources of information to keep up-to-date include the following journals:

1. T.H.E. Journal
2. EDUCOM Review
3. CAUSE/EFFECT
4. Academic Computing

Information resources such as library catalogs are accessed across the Internet by remote log-in. The user appears to the remote system as a terminal. Technically, if the user has an actual terminal, it is connected to

a computer functioning as a terminal server and running the TELNET protocol across the network. Users with workstations actually run terminal emulation software and TELNET directly on the workstation in most cases. But each system on the network has a different user interface, and it is necessary to learn new search strategies and commands for each system. Even if the same systems are relatively easy to use and offer guidance to the new or occasional user, the learning process can be quite tedious. Terminal incompatibilities are another major source of problems. Some of these problems are readily correctable by redesign and reprogramming of existing information-retrieval systems.

Direct use of information resources is done today by remote log-in. In the future it will be done through an interface running on a client interacting with information servers. All European countries are accessible from their national networks to many other countries in the world. But other countries' online catalogs are often not accessible on the networks.

In the future, the librarian must be a manager of info.mation--able to navigate the road maps of complexities and able to assist users in becoming independent and autonomous. Some predict that as new products are marketed without the participation of libraries, and with "virtual terminals" to resolve the complexities and interfaces, (with no interactions necessary to make these connections, and no differences in protocols and commands) libraries, and thus librarians' survival, will be endangered. This will not happen if we keep our staffs trained and educated to function, not just as providers of information, but as managers of quality information able to critically evaluate resources and lead the researchers to the best information and help them in using it to the best of their abilities.

To do this librarians must have some expertise in electronic systems, not just information resources. We must develop an in-depth knowledge of how best to resolve existing problems related to linking systems, standardizing systems and protocols. We must have a master plan to link our countries' information resources and methods for document retrieval and delivery. Currently, it is impossible to learn and to manage all the different systems available. We need to define the rules for technical structure and the standards for suppliers of information systems. Search techniques, too, must be simple and clear.

The role of the library manager of the future will be to increase access to global information sources. Cooperation on an international basis will be necessary. We need to set the stage for bringing about the same user-friendly search structure in our systems.

In teaching end-users, a campus information infrastructure should be built and maintained. Such an infrastructure would include:

1. Technical expertise;
2. User education coordinators and trainers;
3. Training materials and instructional sessions; as well as
4. Dial-in telephone assistance and online instructions.

A task force of the Coalition has developed a list and refinements are being made to provide standardized descriptions of online catalogs and to specify access requirements. The infrastructure is forming and the expectations of scholars are growing. The "virtual library" will be a key part of the new academic and research infrastructure and will advance the creation and use of knowledge. Our task as educators is to coordinate the organization, access, and dissemination of knowledge, resources, and to teach our users how to manage the ever-growing expansion of scholarly output.

Today, many online catalogs, such as MELVYL (University of California at Berkeley Library database) and CARL (Colorado Alliance of Research Libraries database), are truly public access: anyone can sign on across the Internet without an identification. It does seem likely that, as image collections are converted to electronic form and indexed, they too, might be offered through the national network on a public-access basis, much as online catalogs are being made available today.

Librarians will assume new roles in educating researchers on the use of materials available on the network. Librarians will become more involved in the creation and improvement of subject-oriented access and new databases by working with researchers and on grant-funded projects. Their experience will lend itself to a determination of what new access capabilities should be created.

Rather than being replaced by new technology, the emerging role of the librarian is as an active change agent. This role becomes more complex and varied with increased technological access. Some of the necessary characteristics of the librarians in this teaching model would be not just as a librarian but as an:

1. Information linguist well versed in the language of information organization;
2. A computer programmer adept at building a search pattern profile for user types;
3. A classificationist able to interrelate discipline language into informational languages;
4. A wide-based knowledge expert with an ability to communicate in a wide range of discipline languages;
5. A systems designer in implementing remote user systems; and
6. A change agent (Baker, 1989, p. 13.)

For those involved in instructing users, broader technological access moves librarians into an expanded instructional role. More than ever, "librarians must serve as the users' allies in the information age--as trailblazers and watchdogs" (Baker, 1989, p. 15.) Library user education has, in the past two decades, continued to evolve as librarians have grown in their knowledge of learning theory and pedagogical models, new technologies, and increased needs and demands (Baker, 1989, p. 15.)

"The librarians' role is shifting from that which has been primarily concerned with informing users of the availability of information to encouraging critical, evaluative thinking about the masses of information accessible" (Baker, 1989, p. 2.)

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Information Services and Information Utilities
A Management for the User

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Information Services and Information Utilities A Management for the User

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Abstract

Library information systems are complex computer systems of hardware and software components comprising all functions of library activity, such as, e. g., cataloguing, accessions records, periodical administration, book charging, interlibrary loan, and information services as well. Each of these activities must be done for the user of our libraries. The ideal of the seventies, embodied in the conception of large integrated online realtime library systems, could be realized almost nowhere in Europe or the USA. The recent communication technology with its open networks and personal computers of high storage capacity opens up new prospects that appear to promise better and more flexible methods in finding proper and individual answers to the needs of our users in a single library. Also the political situation in our European countries opens new possibilities of information management for all library users.

Information Services and Information Utilities A Management for the User

In 1980, F.Machlup defined the professional intermediary of knowledge as follows: "...one that involves activities, gainful or costly, that are designed chiefly to aid in the generation, transmission, or reception of knowledge of any type, sort, or quality, including giving, directly or through instruments, visual, aural, or otherwise sensible signals, and ranging from carrying messages to creating new knowledge...".

This definition of information by Machlup was complemented by the following classifcation scheme: "General, education, research and development, print media of communication, addressed telecommunication, artistic creation and communication-theater, music, dance, cinema, museums and art galleries, libraries, science information services, technological information services, medical and health information services, other professional information services, financial information services, business information services and management, government information services, advertising and public relations, information machines and equipment."

So there are information services for the user in all walks of life: in the public administration they supply data about demography, the utilization of the soil for the community, or the development of exports and imports; in the private sector of the economy data are stored, offering knowledge information about products and staff members as well as on rival businesses. These information systems can be maintained by hand or by means of automatic data processing.

Libraries also have at their disposal information utilities which have been produced and used for inquiries by hand for centuries, while automated production and interrogation in libraries is now in its third decade. The invention of letter-press printing has brought about a dramatic increase of knowledge, as a result of an increased reading capacity. This led to the creation of broad classification systems by which kwowledge was arranged in classes. At the same time, tools were produced, such as encyclopaedias, that made it possible to render the whole of the existing information in a logical order of relationships. Thus, it was possible to adjust human knowledge into a classification system that was compre-

hensible for the individual mind. In the late 19th and the early 20th centuries, libraries were established as substantial repositories of knowledge. Here, likewise, classification systems were arranged according to the specific ruling fashion. The further accumulation of knowledge in the 20th century resulted in abolishing the classification systems as a means for organizing knowledge. The use of and the interest in these systems was replaced by specialized techniques and tools for the use of specific disciplines, such as thesauri, these being used as a means both for vocabulary control and access to information. This style of laying emphasis upon specialized techniques and tools was continued, keeping pace with the growth of information. At the present time, information is accompanied by other methods of extraction, such as the use of full text systems in natural language as a new electronic form of storing, organizing and passing on information, and the like.

Now stress is laid upon how to offer information without referring to classified structures in electronic systems. Information specialists depend upon the electronic memory in the same way as we have relied upon human memory. Information is stored without using classification, but by means of "particular identifiers". These are a special kind of search term, for example, a subject term or the author.

But here I shall just deal with library information systems set up and used by means of data processing. These information systems serve the administration of the libraries on the one hand, and on the other hand they enable the quick supply of documents and information to the users.

Libraries are centres of information, documentation and communication. It is their task to pass on all kinds of information existent all over the world as quickly as possible and in best quality to those users who need this information in their work in science, economy and technology or for their training and further education. This is done by utilizing up-to-date technology in the best possible way. The services offered by the libraries to their users are known as **"Library Information Services"**. The software technology as a whole, by means of which these services are developed by computer specialists together with librarians, and information and communication specialists, can be referred to as the **"Library Information Systems"**. During the past 25 years data processing brought a revolutionary development for all spheres of information and communication. The libraries are included in this process, and they must respond to this technological progress with regard to their financial situation, but also to their academic, economic and educational functions.

The **Library users** expect better and quicker information services and utilities by reason of the manifold opportunities offered by data processing in connection with information and communication technology. What **librarians** expect to gain are better facilities for their work. The **government** which makes funds available anticipates success manifesting itself quickly for all library users and library personnel, at the same time expecting that the always slender budget is being used as economically as possible.

The advantages and drawbacks of the use of data processing are so manifold, though, that authorities often find it hard to decide what technology should be brought into action in their own country or library. One can always learn from a variety of experiences of other countries and libraries, but choosing a definite strategy and technology, in most cases involves a certain amount of risk for the government, but particularly for the libraries and their users.

Many of those responsible for library affairs, and librarians as well, think that the ideal library information system is the totally integrated library system, making an online-realtime data input, data processing and data output feasible. At the same time it should be possible to provide users in the library and on the university campus via the local area network (LAN) with information, but also to satisfy the needs of users in other libraries and universities of a country through the wide area network (WAN).

But in everyday practical work it often becomes apparent that every integrated library system can only be used efficaciously, when similar types of libraries are united that have a not too great variety of requirements. An excellent circulation system does not simultaneously afford an equally good cataloguing system; a circulation system for books in open access or closed stack cannot be compared with interlibrary loan; a good online public access catalogue (OPAC) can on no account be lumped together with an information retrieval system, nor does it necessarily allow for the production of a printed bibliography or a microfiche catalogue. Book processing of a single library does not correspond with the multifarious administrative assignments of a hierarchically organized university library with all its faculty, special and departmental libraries which for the most part are accommodated in separate buildings, while their funds come from a common budget. A periodical data bank is not simultaneously a fitting instrument for the administrative work with periodicals; using secondary data and biblio-

graphic data from an integrated network does not necessarily imply that advantages only are to be expected, in particular if there are long response times. For many EDP projects in the library information system it appears to be more purposive to develop small, easy-to-survey subareas that can be linked with other subareas. Only then will it be possible to utilize up-to-date technology. The great integrated overall concept for all types and sizes of libraries is an unattainable ideal that, in most cases, will bring limitations and impediments rather than advantages for all types of libraries, both large and small, and special libraries as well.

The future path of large libraries appears to be most promising if they can develop really good subsystems of their own, offering a homogeneous system for the whole, through the use of a common user interface. If need be, several systems may be linked with one another by means of computer-computer communication through open system interconnection (OSI). In this case, an exact interface definition is necessary. On the other hand, small and special libraries can successfully use integrated PC solutions or small-sized computer (minicomputer) systems available on the market. But they should also have the possibility of using the data of other systems through open communication networks and common interfaces.

A complete library information system comprises the following constituent parts:

- **Cataloguing:** This is the gathering of data for newly acquired books, including the creation and use of standard files for corporate and personal names; in addition, the persons doing this kind of work will have to decide whether the holdings of monographs, series and periodicals should be treated separately or in the lump; every volume will have to be identified as a physical individual entity, as this is the only guarantee for the interface used by the issue-desk to be effective; for the OPAC (online public access catalogue) and online keyword access to public information, the exact title of the work will have to be specified. It is significant, though, whether a library holds a work in a single volume or in several separately bound parts.

- **Retrospective conversion:** This term means computer aided data collection of the library's stock that had already formerly been catalogued in book or card form; interfaces to the online catalogue for the staff and to the OPAC will have to be provided for users. Retrospective conversion can be done by a library itself producing a short title

catalogue or with the help of a firm like SAZTEC or OCLC or by using a scanner. Some weeks ago, interesting tests with the catalogue of the Austrian National Library have shown very hopeful results by using a scanner. The speciality in this test was that the catalogue cards are produced by the same typewriter.

- **Use of external data:** application is feasible through national or international data centers or by means of CD-ROM for complete cataloguing and for retrospective conversion as well as for accessions records. The external data of several millions of titles, integrated within the entire system, occasionally lead to a peak load that may exceed the capacity of the computer, thus thwarting the benefit of making use of external data.

- **Accessions records**: interfaces to national and international booksellers will be necessary here, furthermore to the external data, to the cataloguing and finance departments, but also to the charging system, where titles of books requested are to be reserved on the spot.

- **Loans:** the charging system will have to deal with issues both from open access areas and closed shelves, comprising the complete holdings and not only those represented by a catalogue entry; for issues of closed stack books arrangements will have to be made, regarding clear standards for borrower-requests to be executed by the borrower himself; a basic requirement for the user will be the integration of at least the online short title catalogue.

- **Online catalogue information** for the staff
OKAPI: Online Keyboard Access tu Public Information and
OPAC: Online Public Access Catalogue gives anonymous and personal or corporate name entries with an integrated interface to book charging, cataloguing and accessions.

- For the **administration of periodical issues** the data of the periodical titles kept in a library are a basic requirement. It cannot be compared either with the cumulated dataset of a periodical data bank or with handling and controlling the single volumes of the charging system, but it should be provided with adequate interfaces towards these data. All single issues will be recorded at their arrival, and preset patterns will be used for the intervals at which the issues are published. Interfaces to accessions and finances are essential.

- The personnel occupied with **interlibrary loan** will access the centrally stored data of all or several libraries of a country, a region, a town or a

university campus having several libraries, such as faculty and departmental libraries. The personnel will draw on the material that is to be forwarded by having access to the open communication networks, and standardized options will be available for selecting the items needed.

- **CD-ROM:** Compact disc - Read Only Memory is used for the utilization of data in acquisition, cataloguing work, and for retrospective conversion, as well as for special information services to be used by the library's clientele. By 1992, joint standards for CD-ROM had been announced but are not really expected. The first CD-ROM produced through international collaboration of three national bodies has been given financial aid by the European Commission. Query languages are English, French and German, and all European and international standards, such as ISO, CEN/CENELEC, are incorporated

- **Optical discs** are important for the storage of special rare books or drawings and pictures of famous painters and in the whole area of multimedia and hyper-media.

- **Online Information Retrieval** is done for scientists and students of various fields in national and international data centres and specialized information centres, to which the library is linked through communication networks, such as DATEX-P, Tymnet, Telenet or Euronet.

Some additional aspects regarding components of library information services and information utilities as a management for the user in Europe:

Comparing some statistical figures taken from the IM, Information Market, the journal published by the Commission of the European Communities, DG XIII, we find that in Europe there are about 20 million **personal computers**, but less than one million are connected to modems for communication at speeds up to 1200 baud (bit/sec). Only a small fraction of these belong to users of online data bases. On the other hand, the number of information or knowledge workers is far greater. The explanation for this probably lies in the phenomenon that specialists more often than not find themselves confronted with technically complex systems, access to networks being rather too difficult for them. Many managers and knowledge workers still prefer to receive information printouts - even from databases. The way out of this difficulty might be to bring information to the user rather than to compel him or her to do complicated searches in different online databases. In this connection in the University Library of Graz we find that students and very young academics prefer the easy-to-handle CD-ROM-searches and clearly

structured OPACS, which they can use almost without any assistance of library personnel. They usually gather quite a lot of citations on printouts or diskettes, in most cases more than a hundred at a time, and feel much more satisfied than they are with a limited but very precise online-search that had been prepared in collaboration with the information specialist. Using the thesaurus or lists of subject headings, these searches have the nature of information "browsing" and may produce many new ideas in the minds of the young scientists. Besides, professionals like to use selective dissemination of information, the so-called SDI-services, where they regularly find answers to their standardized inquiries. They also want their information requests to be accepted at any time of the day, finding the completely processed information output on their desks as soon as possible, that means some hours (or days) after, at the latest. In consequence, American database managers offer "bring-services". Dow Jones, for example, has a special service for its customers. These are supplied with messages through conversational communication instead of having to use poor computer language for their retrievals. Charging policy was also revolutionized last year. One of the databases that has done so is, for example, ESA/IRS, the European Space Agency/ Information Retrieval Service. This agency no longer charges institutions subscribing to the new service by means of a time-based scale, but by the number of searches and the number of computers in a local area network. Through the introduction of bring-services the information market will probably grow rapidly. The specialists, who need better information in order to do their jobs more effectively, obtain this information in a form in which they can make best use of it.

Computer-computer-transfer via international data networks is not the only way of communication of importance for exchange of data and information and for transmission of full texts. Transfer of complete documents by means of **telefax** is revolutionizing interlibrary loan to a much greater extent than transmitting requests by online-dialing has done so far. While in Germany, for example, the number of telefax subscribers redoubled in a year, the number of telex subscribers remain static. Already there are as many as 84,000, as against 170,000 telex numbers. There are already 33,000 main subscribers for **Datex-P**, this number being exceeded by far by the number of persons entitled to use it. In Germany this boost was made possible when the postal service licenced private modems, too, while modems owned by the postal service itself increased only slightly in the same period. This small growth

rate prevails in Austria, too, where only postal service-owned modems are permitted.

During the last few months there has been an impressive boom in the **BTX-market** in Germany. In contrast to this no substantial progress is perceptible in Austria. This is caused mainly by the slow formation of the BTX-page, a shortcoming that is worsened by the excessive insertion of pictures. In Austria the focus of actual progress is now on database inquiries and on home-banking. This can also be said in respect to the Austrian land register and the database for legal information, both being ready for interrogation through BTX.

All telecommunication systems offer **mailboxing** functions through LANs or WANs. These services are to some extent used by researchers for so-called computer conferences, by means of which new findings can be swiftly exchanged and mutually utilized, provided that the mailbox is used at regular and short intervals. If this is not the case, information by letter is still the better alternative. Moreover, mail is not menaced by LAN insecurity. Technological naivete on the part of the communication managers is one of the main factors of this insecurity. The technology for tapping into LANs is now widely available and can be used by industrial spies.

Reflecting on the European and American library information systems as they have been presented in specialist meetings of **LIBER**, **ELAG** or **IFLA**, one can observe that the individual characteristics of all library systems is making progress. The extensive integrated solutions are disappearing from the market, being replaced by smaller individual answers to requirements, the small systems being able to communicate with one another. These small solutions have been developed for functional spheres of application, such as the issue system, cataloguing, information center services, or interlibrary loan. Along with and in addition to these, there are also trends of providing for newly developed systems which are to be applied in areas where organization is in the foreground of discussion. This applies to special and professional libraries, or detached libraries without any dependencies, such as departmental or faculty libraries, whose needs are quite different from those of large general libraries. Inflexible universal concepts can no longer satisfy the needs of both library users and librarians.

Any library information system that is being developed for the library user of the nineties is based upon a **networked PC technology** making

possible the application of open systems with different compatible hardware and easy-to-use software components.

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Information Technology and User Education Management

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Information Technology and User Education Management

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Abstract

The abundantly aimed use of modern information and communication technologies requires a cooperation between users and library staff in a multiform manner. This is necessary by reasons of subject, regulation, and economy. Therefore, we need a revival and reorganization of several methods used in library science, such as interrogation of users, and user education.

User education can be made effective only by an appropriate management. Knowledges, abilities, and dexterities cannot be mediated by accidental and independent existing methods.

In the center of user education management in the nineties we see the custom of computers. Therefore, we have to inquire:

i) Methods of online user education, CD-ROM user education, end-user education, Computer Assisted Instruction (CAI), guides to the information sources, using of audio-visual materials, and bibliographics. All these methods often arose without any connection to one another, and so we have to determine their place within a user education management;

ii) We need a new definition of user education as a "user literacy", similar to the term "computer literacy".

Information Technology and User Education Management

More than 300 years ago, early in the study year 1648 at the University of Helmstedt, the librarian Melchior Schmid held a lecture entitled "bibliothecaria peritia" for students, and so he founded an educational subject which in German language now is named "Nutzerschulung" or "Benutzerschulung".

That means in English language "users' training", and in my opinion the German term is not the best, but the usage of it is fairly uniform. In English speaking countries it is hard to do whith such comprehensions like user education, user training, user instruction, reader instruction, instruction in library use, library orientation, library instruction, and bibliographic instruction.

My purpose here is to give a definition, yet with regard to a lot of published articles, I do like to reduce it to the lowest terms; quite the contrary, I shall go beyond that. I formulate:

User education is a continuous education and forming of persons in usage information sources, information mediums, libraries, and information offices.

The aim of user education consists of:

1. the forming of particular habits to find a person its way in life. To that belongs particularly
   - the mastery of the access to information as a part of general knowledge like the mastery over the mother-tongue, or the elements of mathematics and natural sciences, concerning not only the developing countries fighting against illiteracy, yet also the advanced industrial countries;
   - the mastery over an uncomplicated and by everybody learnable access to information as a global problem of mankind without limitation on several countries, several age groups, several levels of education, or of several types of libraries;

2. the removal of barriers between user and library staff.

Accordingly the user education promotes:

1. the mastering of information problems because habits, abilities, dexterities, and knowledge in accordance with information is transfered, and so it also promotes an effective use of the expansive library and information services;
2. the creative scientific work by training of critical mind and innovation, and by making familiar the methods and technologies of scientific working; it especially promotes research, management, and qualification for cooperation between several branches of science; this manner aids a quick decision and solution of problems.

Therefore, the user education is a task for all professionals which educates and imparts general knowledge to other persons, such as parents, teachers, authors, editors, archivists, librarians, museum experts, information scientists, and professionals of all branches of science. The limitation of one single profession does not lead to much success, and if there should be any effects, then they will be one-sided and not sufficient. We want to have such peoples who are capable of doing the work; that means they must be masters of answerable methods, and they must be trained in the field of user education.

In addition to that, the limitation of a few methods is likewise dangerous. Any single method is always only one way and only one good dodge for education and training of peoples. In my opinion, one method can only get on together with a lot of other methods in user education.

We know the term "literacy", meaning the "ability to read and to write". Analogous to that, and with regard to all that is mentioned above, it shall be now the right time to create a new term: "informatacy"[1] or "information literacy",[2] which means the "ability to inform oneself". In a final report of the American Library Association Presidential Committee on Information Literacy[3] from 1989 is defined an "information literate person as one who is able to recognize when information is needed and has the ability to locate, evaluate, and use it effectively". And in a very concrete form: "Information literacy is an essential survival skill for the Information Age and libraries are an important part of the information universe."

Inside and between the libraries came in a net of connected information and communication technologies. By this net, the access to holdings and information has been relieved and accelerated in a manner which was never seen till today.

Tasks and working results of libraries have changed more or less by new technologies. New services came in, too. In comparison with the traditional mode of action, the new methods are otherwise full and for this reason we need an education both for librarians and users. The librarian can devise, make or impart new services only if he has acquired the knowledge, abilities, and dexterities necessary for it. The user can have the run of the new library service only if he has instruction and teaching in this service.

By personal computers the user is able to communicate with libraries and data bases direct, i.e. without visiting any person or institution. Therefore we need to change the user education, and parts of it we have to transfer into computing centres or into information offices, but also we should arrange it in computer training of schools. There shall be an increase in the entry difficulties to the libraries, but the utilization difficulties within the libraries shall diminish.[4]

The computer is a very important tool for using a library, and the computer is the starting-point of many methods of user education. These new methods must be joined likewise to a net. For that reason we need an education management. Let us have a look on particular methods.

1. End-user education

   In connection to information and communication technologies in the last years, the comprehension "end user" often appears in addition with "searching" and "education".

   "End users are processors of information who use information sources directly"[5], and "persons who end up using information they have sought, by whatever means"[6]. "The practice whereby end users perform their own on-line searching to retrieve bibliographic information has been referred to in a number of ways, including end-user searching"[7]. Important parallels exist among end-user searching of on-line catalogues, remote bibliographic databases, and CD-ROM indexes. Trends of development demonstrate a growing up of CD-ROM, and artificial intelligence[8]. In all processes of end-user searching you can see how the part of librarians is growing. End-user searching activities can be grouped into two categories[9]:

   1. training librarians and users to search in the work environment
   2. establishing end-user search centres in research and academic libraries.

The origin of end-user education lies in the United States. Early endeavours to use the possibilities of on-line retrieval systems were focused to the technical availability, and to organization problems without user's respect or education. In the last ten years the attention was directed to the lightening of the access by end-user education since on-line systems grew in the U.S.A. and in European countries. The aim was to make the end-user fit for working with the systems without any problems. A number of concepts would be developed for education to meet the demands, both of the users and of the technology. During the first courses, the librarians were not yet educated very well; the training methods were restricted to an introduction of technical aspects. But step by step the librarians came to acknowledge that the full utilization of systems demands new concepts for the education of end-users for the future. Today a lot of very useful methods for training exists; they guide one to a "frequent use of a system and a data base to better use, and some training is better than no training"[10].

2. On-line user education

One part of end-user education can be named on-line user education[11]. On-line user education means user education with regard to application of on-line access to data bases, and to use the on-line catalogues in libraries, too. It is founded on a solid base of interest, engagement, and mind of user, and it assumes general experiences in association with information sources, libraries, information offices, and computers, too. So it is directed to advanced users who have a fundamental user education.

On-line user education must be distinguished from many traditional methods of user education; it needs new ways of thinking and working. It turns to a particular group of user, who often is small and characteristic for end users. Lectures and seminars with general explanations become abundant. Exercises and demonstrations of concrete subjects predominate.

By particular methods the user is enabled to announce his demand and to call for stored information. In comparison to traditional forms existing only on paper, the other habits must be inflicted on the user. It is necessary to demonstrate for him the working method and its results by useful examples, and to prove the advantages. In this connection

we must also take a look at economical questions because by using a computer they have another size than by using printed bibliographies or traditional catalogue cards.

With a view on the next years, the on-line user education can be helpful for use of non-bibliographic data bases or many other new technologies such as digital-based text-graphic systems or systems for analogous and digital information including the combination with CD-ROM and holographic memories, too.

3. CD-ROM user education

In this end of user education, the CD-ROM user education[12] also seems to have a place.

In many papers regarding keeping CD-ROM ready in the libraries, it is concluded that user education is strongly necessary for best use of this technology. The resume is the same as the result of interrogations of students of the Oakland University's Kresge Library after a course[13]:

Were you satisfied with your CD-ROM search results?	60 %
Did the CD-ROM search produce useful references?	62 %
Was the CD-ROM difficult to use?	36 %
Do you feel that using CD-ROM saved you time?	83 %

This overpowering result brings courage to give the statement: there must be a CD-ROM user education, and you have to see this well in the connection to the comprehension of end user, and it ranges the endeavours of the librarians to bring new results of information and communication technologies to the user, and make "savoury". The present experiences allow the following aims:

1. to prepare the user of his working place, which often has modern electronic tools, for example in mathematics, physics, biology, medicine, and in technical sciences;
2. to help the user in the orientation and access with regard to the multitude of information, that he get an overview of the rich offer of information;
3. the user to become absorbed in bibliographic basic knowledge, which he had learned before, by using CD-ROM to make it easy to operate with a new media, to destroy fears, and to develop ideas of time economy in using of CD-ROM;

4. to understand the reasons for choosing the manual, on-line, and CD-ROM versions for particular search;
5. to familiarize users with CD-ROM systems;
6. to understand the difference between natural language and controls thesaurus searching, to introduce toe concepts of searching strategy using Boolean logic;
7. to introduce the functions of searching, printing, storing searches, downloading, and exchanging discs;
8. to understand basic keyboarding skills, including use of the function keys, enter key, and cursor control arrows.

If user support is not adequate at explaining and training the user, there will be limited use of the system and much of the potential gain may be lost"[14].

4. Computer Assisted Instruction (CAI)

Using the computer needs a particular Computer Assisted Instruction[15]. This is a kind of programmed education; it is an application of computers for mediation of knowledge, abilities, and dexterities of library science in the field of education and improvement, as well as in user education. The computer aids the mediation of traditional and modern results of doing in libraries and information offices. All methods of CAI (for beginners without any preliminary knowledge, for advanced people having basic knowledge, for sophisticated persons with special knowledge) are always self-instructions. Each person can determine his own speed of handling by himself. Feed back is coming at once, and everyone can see their advance. But the aim of Computer Assisted Instruction always consists in the mediation of knowledge on one system or one library. We know several programmes such as MEDLEARN for MEDLINE or TRAINER for DIALOG, and ORBIT. CAI is an effective, economical, and useful method for users; they can understand it, and they make use of it. By using the computer, the user learns that the computer is good to store and to again find wanted information. So the user easily becomes acquainted with libraries, and he better agrees with libraries, or he can understand which services libraries and information offices can offer. By existing data bases and on-line catalogues, we can see that satisfying results are possible only by giving instruction.

The modes of form mentioned above nearly use the same methods:

1. Establishing of personal relations between users and the staff of information departments; individual introduction
2. Introduction courses to individual information systems, data-bases and/or on-line catalogues (duration: several hours to several days)
3. Publication of written introductions and guides to libraries, individual information systems, data bases and/or on-line catalogues
4. Integrated transfer of knowledge concerning libraries and information systems by specialists in teaching, research, management, and teaching documents.

Let us have a detailed look at some methods:

1. Individual education (one-to-one-method)

   The need of information for users in the beginning of a work or during the training is uncertain, and it is possible to train many users by lectures of introduction or seminars. This situation changes depending on advanced knowledge and concrete task. For that reason, the lessons will find a smaller number of participants. In the end, only one user with one concrete task can receive the right information only by one employer. This is clear to see by enlarging the quantity and the quality of data bases.

   The individual education of the user requires an explanation of special events with handling the scientific information or the handling of bibliographies and information services. That means that one user gets information on particular services of libraries and information offices by one employer. I believe the importance of this method will grow because the use of electronical memories is more difficult in the beginning than use of printed materials. The individual consultation, the conversation face-to-face, is the best for the user.

2. Written Introductions[16]

   With regard to making full use of information, libraries, and information offices, the publishing of written instructions is necessary as a

   1. guide to information sources
   2. guide to library information services

3. guide to particular reference works
4. guide to information technologies and to its results.

The guides to information sources mentioned at first have a long tradition; they arose in the 17th century. During the last ten years voluminous presentations were published in many fields of social and natural sciences, such as mathematics, physics, chemistry, and bio-sciences. There we can find allusions both to traditional sources, and to sources based on new information and communication technologies.

An analysis of possible services by new information and communication technologies has shown that the full use of the specific searching possibilities is difficult or unable for the user if there are none, or only imperfect allusions to the use.
This result gave a rise to a volatile ascending of the number of published leaders to data bases and on-line catalogues. The abundance commits a weakness: there are no common or general criteria for the content of such publications.
The aims, the kind of problems, the presentations, and the arrangements are very different. For that reason we can welcome each publication which discusses such criteria, because the number of the new introductions will grow, too. We hope that handiness can change for the better.

3. Self-instruction

With regard to the new information and communication technologies, the self-instruction is important. We have mentioned above that the user can directly communicate with libraries, and data bases, too. This important change of behaviour of persons provokes the self-instruction as a kind of user education. Self-instruction was usual in many sciences long ago.

4. Audio-visual materials and possibilities

For perhaps 25 years we know several audio-visual methods of user education. We remember that the use of slides and films has a long tradition. But the use of it was sometimes disputed; there were overstatements, and the use often was not in addition to verbal instruction, but rather an alternative or a substitution. Indeed, by television, video records, and satellite telecast we can prove new possibilities. Some reports[17] published since 1985 allow the con-

clusion that "Videotape instruction" and the "library instruction via satellite" can become important methods of use of information and communication technologies in the next years, adequate to the use of data bases and library services. "Interactive video" i. e. "is a new technology that can combine three features of video - motion, colour, sound - with the interactivity of the computer. "Interactivity" refers to the ability of the student or user to make choice or respond to exercise questions and receive feedback from the system."[18]

Summary

The examples demonstrate that a guided, uncomplicated, and effective employment of results of libraries and information offices is hardly possible without user education management. This was discovered especially in England and in the U.S.A., and they search for principles of information literacy. There is the hope to carry on the old methods of old user education, or - as to say in the U.S.A. - bibliographic instruction.

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Information Technology and Library Management Summing up

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Information Technology and Library Management

Summing up

What a delightful conference! And in honour of Margaret Beckman. What a privilege for me! This is my first visit to Essen. I only met Ahmed about two years ago, but I feel I have known him all my life. He is quite unique! Thank-you, Ahmed, for inviting me, thank-you also to your most courteous and charming staff. You must hand-pick them! Thank-you also to the sponsors who have provided us with such excellent feasts.

Last year I understand that Ellen Pearson gave everybody a list of questions to answer just to see whether they had been listening! I have the temerity to ask you just one question. How many of you took up librarianship with enthusiasm as a first-choice career? As I thought, very few, but how intelligent of the rest of you to decide to change to such a worthwhile occupation!

Fred Kilgour said several times during this symposium that "there is no statement of purpose of what a library is", and yet I was fascinated by him telling us of a Yale social scientist saying; "... I don't go to the library because there is too much interesting material there". I feel that that statement contains part of the answer at least to Fred's questioning regarding 'purpose'. A lot of a library's purpose is just to 'be' and not necessarily to 'do' and we stand in some danger of losing sight of that to the great detriment of our libraries. Ronald Schmidt's comment that he is "married to a 'researcher' who never goes to a library but rings an informed person", is quite typical of the behaviour of many scholars and researchers over the years.

I was pleased indeed to read an editorial by Art Plotnik in the March 1984 issue of American Libraries entitled 'Information madness'(1). In it he said:

"Though no one can fault information in its place, I can barely stomach the word any more. I share the Boorstin bias, as he expressed it not long ago:

> '...flimsy bits of information inundate and confuse us. This flood of messages from the instant-everywhere fills every niche in our consciousness, crowding out knowledge and understanding. For while knowledge is orderly and cumulative, information is random and miscellaneous. Information industries flourish, but our knowledge industries - schools and libraries - go begging"(2).

Plotnik goes on to say:

> "That information tends to crowd out everything else, becomes more worrisome as one library organisation after another adds 'information' to its name, then drops the 'library' altogether. Language shapes attitudes, and when people stop saying 'library' they will stop thinking about it - except in terms of one of its narrower functions, such as information."

An important element of this conference has been the evening presentation. Last night it was Carnegie, but the night before it was your special dream, Ahmed, the rebirth of the great library of Alexandria - 'Bibliotheca Alexandria'. Surely only someone with a clear and dedicated view of the 'library' as an entity important for what it is in itself - a sum greater than all its parts - could possibly devote himself to the project as you have.

Now if you hold a view of libraries that does not want to throw the baby out with the bath-water, as we say in England, that will affect your whole approach to library management; your perceptions of the role of IT; and its impact on your decision-making, resource allocation, budgeting, manpower planning and training.

This year's and last year's symposia have been dedicated to two librarians for whom I have always had the greatest respect although we have only met of recent years - Margaret Beckman and Dick De Gennaro. Margaret honoured a 1984 Bath conference by giving a paper. In it she recognized two important facts:

(i) the critical role of the library in scholarly communication.

(ii) the service to the end-user.

I will return to what Margaret said later.

Dick spoke at the following conference. I have always valued his articles. In 1984 he wrote:

> "...The challenge to librarians in the decade ahead is two-fold: 1) to automate their public catalogs and internal operations and develop

the capacity to deal with large quantities of information in a variety of new electronic forms, and 2) to continue to strengthen and provide for the growth of their traditional collections and services ... The challenge to those who fund libraries is to provide the financial resources that will be needed to accomplish this two-fold task"(3).

So we have to get the balance right - but my goodness it is a hard task given present-day political and economic pressures.

Now to this symposium! I do not know that I will quote from every paper - but please do not feel offended if I fail to do so. I considered the presentations to be of a very high standard of content and I fear that it is I who will probably let Ahmed down!

I am not absolutely sure that the subject of the symposium was fully addressed. Ahmed always chooses very specific titles for his conferences. Perhaps it is just semantics, but I felt that the focus was sometimes as much about library automation as about IT. If there is a difference, as I consider there is, then perhaps some of the management implications are different, e.g. the impact on resourcing of libraries, of the growing use of wide area and public telecommunication networks. All of the main themes consistent with the title of this conference were covered, with the exception of 'the library' itself - hence my foregoing remarks - although Schmuel Sever's paper, which I found a model of clarity on the 'free' vs. 'fee paying' issue, did touch on the social value of the library. To the main 'themes', therefore.

Information Technology

The IT itself was dealt with in some considerable detail (although not always with the implications for management in mind). Arnold de Kemp's presentation was a breathless tour de force of technological enthusiasm - electronic books, hyper-media, hi-vision - it all came tumbling out. I felt he was going to produce an electronic rabbit (sorry fox!) out of an electronic hat at any minute! More seriously, I was especially interested in the particular emphasis he placed on the importance of SGML.

The paper by David Price on multi-tasking of micros left me a little bemused - my fault not his - but I considered his thesis of "minimal micro management, but maximally usable" absolutely the right management objective. He stressed the importance of having computer expertise on site and Christian Heinisch complemented this by stressing the need to appoint a 'CD-ROM Administrator'. David's comment that "programs

can run amok if staff are left to themselves" underlined the importance of library managers ensuring that expertise is on hand, either through the staff establishment or through a good working relationship. There have been too many instant experts in library automation - "In the land of the blind the one-eyed man is king!"

Training

One of the really salient features of this symposium was the emphasis placed on the need for adequate training. Training in its widest sense (i.e. continuing and initial) not only to ensure smooth running of the system, but almost as importantly, as Ellen Hoffmann told us, to instil confidence in the staff. She reminded us that there is a need to recognize that even positively valuable aspects of change can cause stress - the negative ones certainly can! My only concern from the UK perspective is that I doubt that funds will ever be available for the adequate level of investment to which Ellen referred. I liked her structured approach to training: for what, for whom, when and how. She reminded us of a simple formula: "Tell, show, do!"

I was very, very rude and told Mary (Mary Huston) that her English included some rather long words and phrases! Nevertheless, she made some most important points about the need for managers to develop vision and to generate a spirit of enquiry within the organization. Participative management may seem an obvious policy, but I know only too well that it is often non-existent. The 'human component', as Mary rightly reminded us, is vital in any successful implementation. In answer to a question, Mary stressed the value of developing services out of one's own experience. I thought this an excellent point.

David McDonald, in his really first-class presentation, also stressed the need to be aware of both the process and content of human interaction. Among skills needed were how to exploit 'groups' to full effect and also how to communicate! The last being a most vital requirement not only within the department, but also with other parts of the organization - especially the computer specialists. (Lack of proper communication is the Achilles heel of so much human relationship - be it in the family, social and political environment, or in the workplace).

Management principles

David McDonald's paper is one, which when printed, must provide us all with a most valuable checklist of points to be considered in relation to good management practice. There is no magic formula, but he did give us:

SA (Successful automation) = I (Intelligence) + V (Vision) + TU (Technical understanding) + HW (Hard work).

He also bolstered our morale! After all, he admitted to being an optimist (I am a pessimist just to protect me from disappointment). David said that we should be proud of many of our achievements and should recognize that our resources cannot be compared with those of commerce and industry. David's comments were consistent with those of Dick De Gennaro, when he stated that, "IT does not reduce absolute costs, rather it enables libraries to reallocate resources". (HOPEFULLY!)

David Price's and Christian Heinisch's papers were both very relevant to general management issues. Christian highlighted the need for good analysis to ensure effective management control of a CD-ROM network. This emphasis of the importance of adequate analysis was consistent with David McDonald's advice to make full use of such planning and management tools as 'critical path analysis' in the scheduling and monitoring of projects and in initiating corrective action when necessary.

End-users

This morning the fact that presentations have been restricted in number is a great pity because today the emphasis was on the really vital topic of the end user. The very raison d'etre for our existence as library and information specialists! Maureen Pastine believes that: "Libraries need to assume a leadership role in teaching end-users and potential end-users how to access networks to retrieve information regardless of where it is located." Interestingly - apart from the CD-ROM network paper - this was one of very few references to this burgeoning area of interest, though Sigrid referred to networks. She also spoke of high storage capacity personal computers that appear to open up new prospects for better and more flexible methods for finding "proper and individual answers to the needs of our users in a single library." One important topic Sigrid mentioned was retrospective conversion. This was also referred to by

Ronald Schmidt. Both speakers referred to the need for good authority control. I was especially interested to hear of the scanner experiment at the Austrian National Library.

If Dieter Schmidmaier had been with us he would have stressed that "user education can be made effective only by an appropriate management". I was sorry not to be able to hear him expand on this statement.

We had two papers on service to end-users. Renate Niegl's description of the RDB - the Austrian Legal Database with its ability to supply full-text, printed out either online/offline or stored in one's own p.c. (We did not talk much about copyright problems did we? Although someone did express the opinion that copyright would eventually become a non-issue! That will be the day!)

Karl Stock spoke of the possibility of linking "bibliographic expert systems" to OPACs. I find this idea attractive and it certainly seemed to be consistent with the views expressed by Wilf Lancaster about subject access in his opening paper. I found myself in agreement with a major part of Wilf's paper. It was a good opening address although many of you did not find it all that contentious - that encouraged me greatly! He believes that 'many librarians are obsessed with technology' and library educators 'mesmerised' by it. 'Automation was sometimes almost a goal in itself', but he asked, "Has intellectual access improved?".

Alasdair Paterson in his paper, which so elegantly linked the academic traditions of the past (with quotes from books - Peter Abelard, Bernard of Chartres and others) with today's world, made the point that the more spent on access the less on materials - the less on materials the more on access, and it takes us time to think best what to do with our new technology. His comment that reading and writing skills may well become less important leads me to my concluding section.

Alasdair's paper, 'The Wheel of Fortune: Academic Libraries, IT and the Re-emerging Past', enables me to bring to your attention - if you are not already aware of it - an excellent article entitled 'Reclaiming our Technological Future' by Patricia Glass Schuman (one time librarian in both public and academic libraries, but now president of Neal-Schuman Publishers, New York), which appeared in the March lst issue of Library Journal (4). I can only quote you a few extracts at random, you must read the rest for yourselves:

> "Take the information explosion fantasy. The statistics are dramatic. ... But what are these statistics really dramatizing? They tell us that

there is more data than ever before; not that there is better data, more relevant information, or even a more knowledgeable society.... What we are actually experiencing is not an information explosion. It is an explosion of data. Some scientists now claim that it takes less time to do an experiment than to do the research to find out whether or not it has been done before....Rather than universal delivery, there is a very real possibility that technology could widen the gap between the information rich and the information poor....An individual must be literate in order to negotiate our complex social, political, economic, and work environments. But print illiteracy is almost a national disease....What does our fantasy about direct home delivery of information services really mean in a society where 25 percent of households below the poverty line have no telephone?"

Just by coincidence, on my way here I picked up a copy of the Daily Telegraph of 20 October, and read an article by Stephen Pimenoff entitled 'Good reasons for reading'(5). Again, here are a few quotes:

> "...the emphasis is shifting away from language to computer literacy. ...If advances continue in voice synthesisation we may have machines to which we can talk, and they will talk back. They will do our reading and writing for us; and their spelling, punctuation and syntax will be faultless... Perhaps the time has come for greater awareness of the larger benefits to be derived from being literate. Clearly, those benefits do not include the ability to communicate facts, and information, for this is precisely what the new media do supremely well....their transmission could not be bettered for speed and reliability. ...Often the information comes at the viewer with a speed which makes thought impossible. It is not necessary to be literate to be well-informed today....The importance of literacy becomes apparent only when the data have been collected and the machines switched off. In the future, are we going to have enough people with the ability to evaluate and interpret the information they possess in such abundance?"

So long as librarians remember the role of libraries as enablers of literacy, and can combine this role with the proper management of the use of IT to extend and maintain their services to the end-user in the most effective way, I am an optimist about our future. Margaret Beckman has always been concerned with the user. Let me finish with quotes from her paper at the 1984 Bath conference(6).

"Libraries have always been a critical part of the scholarly communication process....

...As technologies change at a speed and with a diversity that is sometimes difficult to comprehend, I can hope only that libraries will recognize the implications of those changes...and we would be well advised to focus our concern for networks, for linkings, for resource sharing, on to the user himself."

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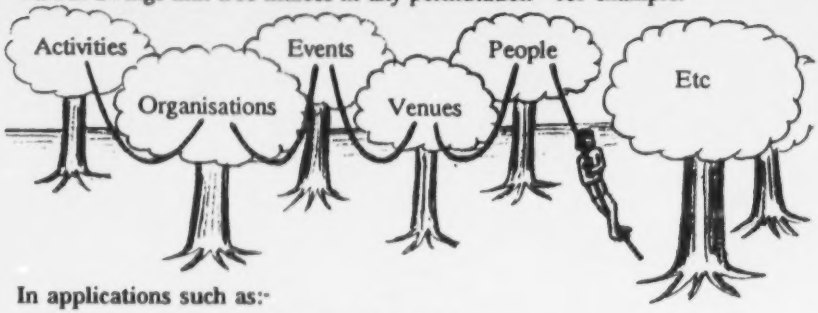
TARZAN SWINGS - O.K.!

Tarzan Swings link tree indices in any permutation - for example:



In applications such as:-

Information and Services - Local, Public, Community
Subjects, Activities, Organisations, People, Places, Sphere of Influence, Courses.
Education, Training, Employment, Sport Leisure, Tourism, Emergency Services,
Health, Hobbies, Law, Social Services, etc.

Catalogues	- Libraries, Museums, Art Galleries, Media Centres, Depots.
Archives	- Minutes, Documents, Films, Photographs, Drawings, Maps, Plans.
Pedigrees/Genealogies	- Animals (including humans), Vegetables, Parts Lists (including hierarchical), Loading Schedules.
Abstracts/Cuttings	- Periodicals, Newspapers, Proceedings.
Diaries of Events	- Fully Qualified.

In fact, any data bases which can be indexed and particularly those which benefit from hierarchical arrays - either in combination or individually.

When talking about tree searching, what could be more natural than to refer to the transfer from searching one tree to another as a Tarzan Swing? The Tarzan films, which seemed so entirely natural and credible when we were young, must have required considerable preparatory work to give this impression as well as some carefully placed strong ropes (camouflaged as creepers) before filming each sequence.

Naturally, Tarzan has to be a perfect specimen, uncomplicated, purposeful and with bulging muscles. In the I.T. sense, these attributes are equally essential and so ALS produces systems with purposeful software and hardware with real muscle. This powerful combination, though deceptively simple to use is camouflaged by sensible costs. The blood-curdling Tarzan call is a customer option. . . . . .In short, could you have found the missing link?

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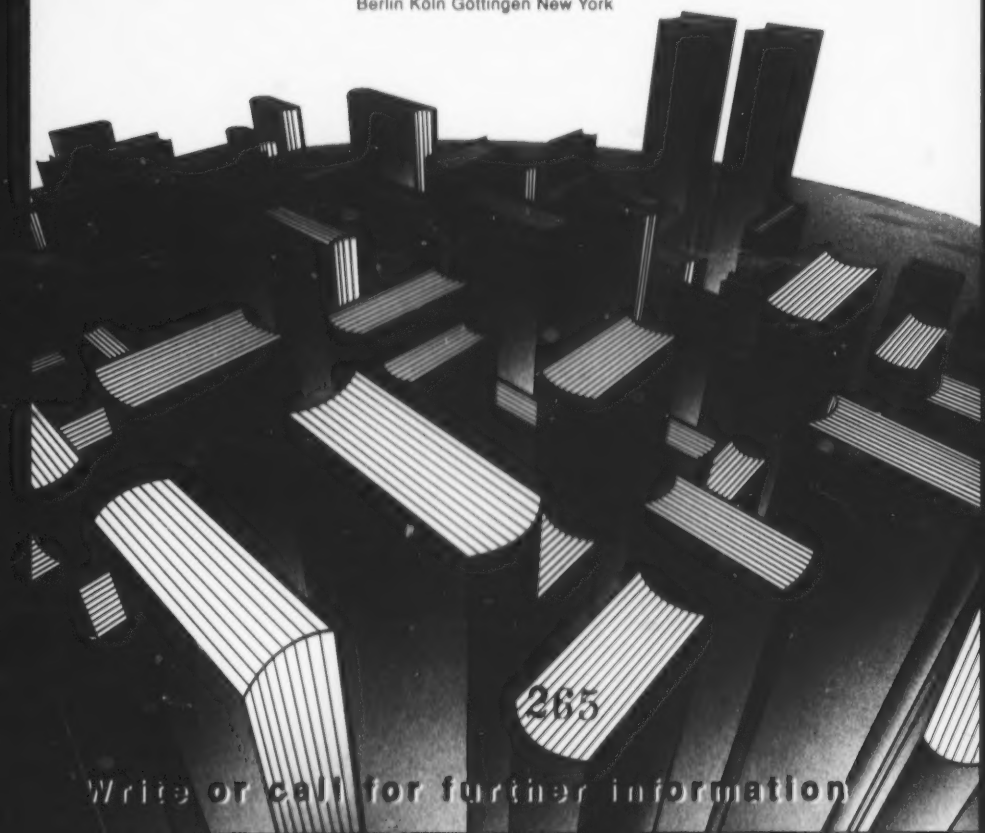

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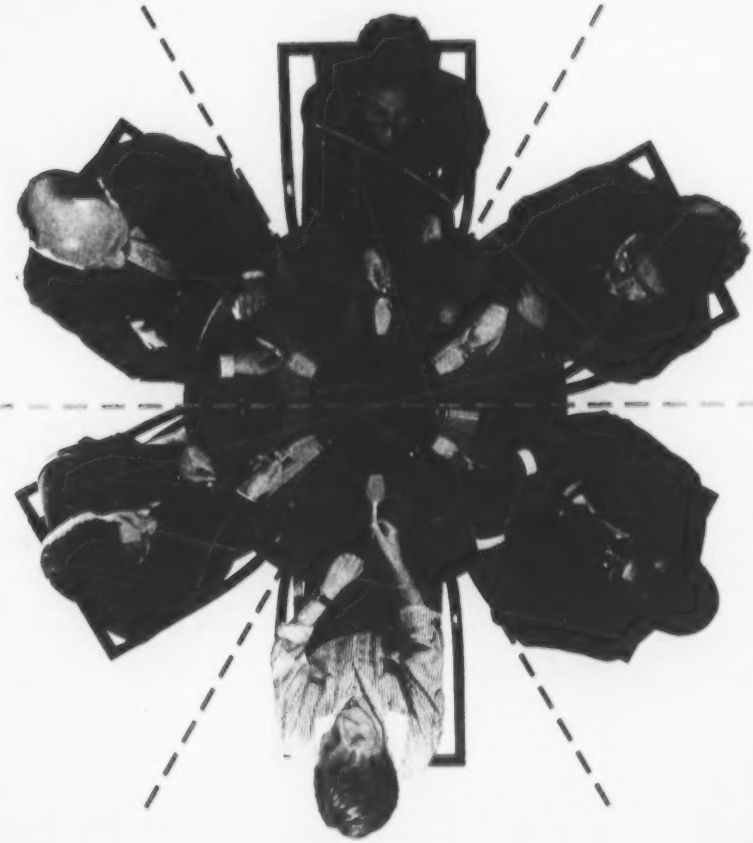

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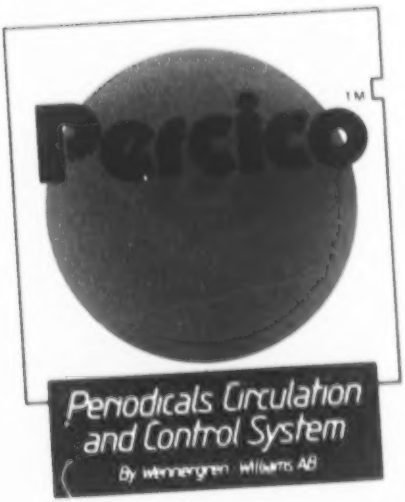
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